

INFLECTIONAL MORPHOLOGY IN A MINIMALIST GRAMMAR

Gereon Müller
Universität Leipzig

www.uni-leipzig.de/~muellerg
gereon.mueller@uni-leipzig.de

Compact Course
Spring School on Linguistic Diversity
Leipzig
March 31–April 4, 2008

Contents

| | |
|---|-----------|
| 1 Introduction | 3 |
| 1.1 Basic Assumptions | 3 |
| 1.2 Morphology/Syntax Mismatches | 3 |
| 1.3 Distributed Morphology | 7 |
| 1.4 Paradigm Function Morphology | 19 |
| 1.5 Minimalist Morphology | 26 |
| 2 Class Features | 29 |
| 2.1 Introduction | 29 |
| 2.2 Class Features in Morphology | 29 |
| 2.3 Class Features in Syntax | 34 |
| 2.4 Proposal | 37 |
| 2.5 Further Issues | 38 |
| 3 Fission and Impoverishment | 39 |
| 3.1 Syncretism and Iconicity in Icelandic Noun Declensions | 39 |
| 3.2 Global Impoverishment in Sierra Popoluca | 44 |
| 3.3 A Pre-Syntactic Alternative | 49 |
| 3.4 Appendix: Pike on German Verbs | 50 |
| 4 Morphological Richness | 52 |
| 4.1 Introduction | 52 |
| 4.2 A Distributed Morphology Approach to German Verb Inflection | 53 |
| 4.3 Pre-Syntactic Morphology | 54 |
| 4.4 Pro-Drop | 55 |
| 4.5 Pro-Drop in the Presence of Syncretism | 58 |
| 4.6 Conclusion | 61 |
| 4.7 Outlook | 61 |
| 5 Enrichment | 62 |
| 5.1 Introduction | 62 |
| 5.2 Extended Exponence in Argument Encoding Systems | 62 |
| 5.3 Distributed Morphology | 64 |
| 5.4 Noyer's Analysis of Verb Inflection in Tamazight Berber | 65 |
| 5.5 Enrichment | 66 |

| | |
|--|-----------|
| 5.6 Verb Inflection in Swahili | 66 |
| 5.7 Enrichment Rules for German, Archi, Timucua, and Sierra Popoluca | 67 |
| 5.8 Conclusion | 69 |
| 5.9 Pre-Syntactic Morphology | 69 |
| 6 Paradigm Economy | 69 |
| 6.1 Introduction | 69 |
| 6.2 Paradigm Economy | 70 |
| 6.3 Paradigm Economy as a Theorem | 73 |
| 6.4 Conclusion | 78 |

Chapter 1

Introduction

1.1 Basic Assumptions

Central questions:

1. To what extent can marker homonymies in inflectional paradigms be derived systematically?
2. What should a theory of inflectional morphology look like that is compatible with basic tenets of the minimalist program?

Central claims:

- (1) *Syncretism Principle* (meta-grammatical):
Identity of form implies identity of function (within a certain domain, and unless there is evidence to the contrary).
- (2) *Inflectional morphology in a minimalist grammar*:
 - a. is lexical-realizational (DM, PFM)
 - b. employs underspecification and specificity-based competition (DM, PFM, MM)
 - c. relies on decomposition of features for grammatical categories (case, person, number, gender, inflection class) (DM, PFM, MM)
 - d. is pre-syntactic (MM)

1.2 Morphology/Syntax Mismatches

Morpho-syntactic features between morphology and syntax

Morphology:

Inventory of inflection markers

Syntax:

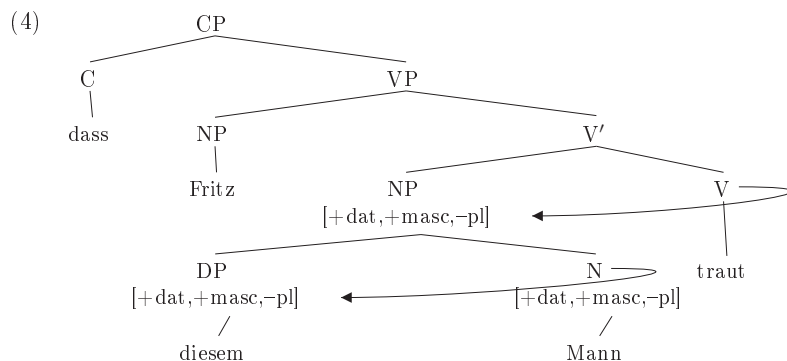
Distribution of inflection markers

Syntactic structure

Paradigm 1: Pronominal inflection in German

| | [-pl] | | | [+pl] | | |
|--------|---------|---------|--------|---------|---------|--------|
| | [+masc] | [+neut] | [+fem] | [+masc] | [+neut] | [+fem] |
| [+nom] | -er | -es | -e | -e | -e | -e |
| [+acc] | -en | -es | -e | -e | -e | -e |
| [+dat] | -em | -em | -er | -en | -en | -en |
| [+gen] | -es | -es | -er | -er | -er | -er |

(3) dass Fritz diesem Mann traut
that Fritz_{nom} this man_{dat} trusts

*Observation:*

Here it looks as though one could assume that the morpho-syntactic features that are relevant in the morphological component (inventory) and the morpho-syntactic features that are relevant in the syntax (distribution) are identical.

*Asymmetries**Problem:*

There are asymmetries between morphology and syntax with respect to morpho-syntactic features. Two examples:

- (i) Inflection class features are relevant in morphology, but irrelevant in syntax.
- (ii) Underspecification is relevant in morphology, but (typically) not in syntax.

Necessity of inflection classes

Observation (Aronoff (1994), Corbett & Fraser (1993), Fraser & Corbett (1994), Halle (1994)):

Independently motivated features (morpho-syntactic features like gender, phonological features like soft or hard stem ending, semantic features like animacy) do not suffice to correctly predict the inflection class for a given stem in all cases. It seems that specific inflection class features on stems are unavoidable.

Paradigm 2: Russian noun inflection, inflection class [1], singular : [+masc]

| | I | | |
|---------|--------------------------------|----------------------------------|-----------------------------------|
| | zavod _m ('factory') | student _m ('student') | žitel _m ('inhabitant') |
| nom/sg | zavod-Ø | student-Ø | žitel'-Ø |
| akk/sg | zavod-Ø | student-a | žitel'-ja |
| dat/sg | zavod-u | student-u | žitel'-ju |
| gen/sg | zavod-a | student-a | žitel'-ja |
| inst/sg | zavod-om | student-om | žitel'-em |
| prep/sg | zavod-e | student-e | žitel'-e |

Paradigm 3: Russian noun inflection, inflection class [2], singular: [+fem], [+masc]

| | II | | | |
|---------|------------------------------|-------------------------------------|------------------------------|-----------------------------|
| | komnat _f ('room') | učitel'nic _f ('teacher') | nedel' _f ('week') | mužčin _m ('man') |
| nom/sg | komnat-a | učitel'nic-a | nedel'-ja | mužčin-a |
| akk/sg | komnat-u | učitel'nic-u | nedel'-ju | mužčin-u |
| dat/sg | komnat-e | učitel'nic-e | nedel'-e | mužčin-e |
| gen/sg | komnat-y | učitel'nic-y | nedel'-i | mužčin-y |
| inst/sg | komnat-oj(u) | učitel'nic-ej(u) | nedel'-ej(u) | mužčin-oj(u) |
| prep/sg | komnat-e | učitel'nic-e | nedel'-e | mužčin-e |

*Necessity of inflection classes**Observation:*

Most of the variation concerns the choice of the plural marker. However, in the singular, too, inflection class features must be postulated in order to capture the assignment of stems to inflection classes: strong vs. weak masculine nouns. Again, independently motivated features of stems do not suffice here. (Cf., e.g., [±animate] – see *Dirigent* 'conductor' vs. *Planet* 'planet').

*Syncretism and underspecification**Observation:*

There are many homonymies of inflection markers: *syncretism*. (There is a narrow notion of syncretism: one marker for more than one case. There is also a more general interpretation: formal identity of different cells in any given paradigm. I adopt the latter notion.) It is not a priori clear to what extent syncretism can be viewed as systematic, and to what extent it might be accidental. However, it is uncontroversial that at least some instances of syncretism are not accidental. Consequently, the question arises of how to account for the phenomenon.

*Example and Analysis**Example:*

There are 24 different paradigm cells in paradigm 1, but there are only 5 distinct markers: *-e*, *-er*, *-en*, *-es*, *-em*. Thus, there is only one marker for the morpho-syntactic feature specifications [+dat,+masc,-pl] and [+dat,+neut,-pl]: *-em*; and this marker is

Paradigm 4: Russian noun inflection, inflection class [3], singular: [+fem]

| | III | | |
|---------|--|------------------------------------|---------------------------------------|
| | <i>tetrad'</i> _f ('notebook') | <i>myš'</i> _f ('mouse') | <i>doč'</i> _f ('daughter') |
| nom/sg | tetrad'-Ø | myš'-Ø | doč'-Ø |
| akk/sg | tetrad'-Ø | myš'-Ø | doč'-Ø |
| dat/sg | tetrad-i | myš-i | doč-er-i |
| gen/sg | tetrad-i | myš-i | doč-er-i |
| inst/sg | tetrad'-ju | myš'-ju | doč-er'-ju |
| prep/sg | tetrad-i | myš-i | doč-er-i |

Paradigm 5: noun inflection in Russian (simplified)

| | [-pl] | | | [+pl] | | |
|---------|-------|-----|-----|-------------|-------|--------|
| | [1] | [2] | [3] | [1] | [2] | [3] |
| [+nom] | -Ø | -a | -Ø | -i | -i | -i |
| [+acc] | -Ø/-a | -u | -Ø | -i/-ov(-ej) | -i/-Ø | -i/-ej |
| [+dat] | -u | -e | -i | -am | -am | -am |
| [+gen] | -a | -i | -i | -ov(-ej) | -Ø | -ej |
| [+inst] | -om | -oj | -ju | -ami | -ami | -ami |
| [+prep] | -e | -e | -i | -ax | -ax | -ax |

different from all the other markers in paradigm 1.

Analysis: natural classes and underspecification:

A common basis of the instances of a given syncretism is sought – a property that the different contexts exhibiting an identical marker have in common. This property characterizes a *natural class* of morpho-syntactic specifications. In the case at hand, [+dat,+masc,-pl]- and [+dat,+neut,-pl] contexts differ only with respect to gender information. Assumption: [+masc] and [+neut] form a natural class. Natural classes can be derived from a *decomposition* of the standard morpho-syntactic features into combinations of more abstract primitive features.

(5) *Decomposition of gender features in German:*

- masculine = [+masc,-fem]
- feminine = [-masc,+fem]
- neuter = [-masc,-fem]
- [] = [+masc,+fem]

Underspecification:

The idea then is that inflection markers do not have to be characterized by fully specified morpho-syntactic features; they can also be characterized by *underspecified* morpho-syntactic information. For instance:

The marker *-em* is not characterized as [+dat,+masc,-fem,-pl] or as [+dat,-masc,-fem,-pl]. Rather, this marker is characterized by a feature specifi-

Paradigm 6: German noun inflection, inflection classes [1]-[4]

| | [1] | [2] | [3] | [4] | | | |
|--------|-----------------------------------|--------------------------------------|------------------------------------|------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| | <i>Hund</i> _m 'dog' | <i>Schaf</i> _n 'sheep' | <i>Baum</i> _m 'tree' | <i>Buch</i> _n 'book' | <i>Mann</i> _m 'man' | <i>Strahl</i> _m 'ray' | <i>Auge</i> _n 'eye' |
| nom/sg | Hund-Ø | Schaf-Ø | Baum-Ø | Buch-Ø | Mann-Ø | Strahl-Ø | Auge-Ø |
| acc/sg | Hund-Ø | Schaf-Ø | Baum-Ø | Buch-Ø | Mann-Ø | Strahl-Ø | Auge-Ø |
| dat/sg | Hund-Ø | Schaf-Ø | Baum-Ø | Buch-Ø | Mann-Ø | Strahl-Ø | Auge-Ø |
| gen/sg | Hund-es | Schaf-es | Baum-es | Buch-es | Mann-es | Strahl-s | Auge-s |
| nom/pl | Hund-e | Schaf-e | Bäum-e | Büch-er | Männ-er | Strahl-en | Auge-n |
| acc/pl | Hund-e | Schaf-e | Bäum-e | Büch-er | Männ-er | Strahl-en | Auge-n |
| dat/pl | Hund-en | Schaf-en | Bäum-en | Büch-ern | Männ-ern | Strahl-en | Auge-n |
| gen/pl | Hund-e | Schaf-e | Bäum-e | Büch-er | Männ-er | Strahl-en | Auge-n |

Paradigm 7: German noun inflection, inflection classes [5]-[8]

| | [5] | [6] | [7] | [8]I |
|--------|--|-------------------------------------|-------------------------------------|--|
| | <i>Planet</i> _m 'planet' | <i>Ziege</i> _f 'goat' | <i>Maus</i> _f 'mouse' | <i>Drangsal</i> _f 'distress' |
| nom/sg | Planet-Ø | Ziege-Ø | Maus-Ø | Drangsal-Ø |
| acc/sg | Planet-en | Ziege-Ø | Maus-Ø | Drangsal-Ø |
| dat/sg | Planet-en | Ziege-Ø | Maus-Ø | Drangsal-Ø |
| gen/sg | Planet-en | Ziege-Ø | Maus-Ø | Drangsal-Ø |
| nom/pl | Planet-en | Ziege-n | Mäus-e | Drangsal-e |
| acc/pl | Planet-en | Ziege-n | Mäus-e | Drangsal-e |
| dat/pl | Planet-en | Ziege-n | Mäus-en | Drangsal-en |
| gen/pl | Planet-en | Ziege-n | Mäus-e | Drangsal-e |

cation that is underspecified with respect to gender: [+dat,-fem,-pl].

Observation:

The same situation arises with case features. Consider again paradigm 1. The marker *-es* is employed for both nominative neuter and accusative neuter contexts. This syncretism is in line with a basic Indo-European principle, and thus certainly not accidental.

(6) *Reconstructed case system of Proto-Indo-European, singular only*

| | *e/o stems | | other stems | |
|-----|------------|------|-------------|------|
| | MASC/FEM | NEUT | MASC/FEM | NEUT |
| NOM | *-s | *-m | *-s/*-Ø | *-Ø |
| VOC | *-Ø | *-m | *-Ø | *-Ø |
| ACC | *-m | *-m | *-m | *-Ø |

The syncretism with *-e* in nominative feminine and accusative feminine contexts in German looks systematic in the same way (the same may also hold for the plural).

Paradigm 8: Noun inflection in German (simplified)

| | [1] _{m,n} | [2] _m | [3] _{n,m} | [4] _{m,n} | [5] _m | [6] _f | [7] _f | [8] _f |
|------------|--------------------|------------------|--------------------|--------------------|------------------|------------------|------------------|------------------|
| [+nom,-pl] | -∅ | -∅ | -∅ | -∅ | -∅ | -∅ | -∅ | -∅ |
| [+acc,-pl] | -∅ | -∅ | -∅ | -∅ | -(e)n | -∅ | -∅ | -∅ |
| [+dat,-pl] | -∅ | -∅ | -∅ | -∅ | -(e)n | -∅ | -∅ | -∅ |
| [+gen,-pl] | -(e)s | -(e)s | -(e)s | -(e)s | -(e)n | -∅ | -∅ | -∅ |
| [+nom,+pl] | -(e) | -”(e) | -”er | -(e)n | -(e)n | -(e)n | -”(e) | -(e) |
| [+acc,+pl] | -(e) | -”(e) | -”er | -(e)n | -(e)n | -(e)n | -”(e) | -(e) |
| [+dat,+pl] | -(e)n | -”(e)n | -”ern | -(e)n | -(e)n | -(e)n | -”(e)n | -(e)n |
| [+gen,+pl] | -(e) | -”(e) | -”er | -(e)n | -(e)n | -(e)n | -”(e) | -(e) |

Analysis (Jakobson (1962a,b), Bierwisch (1967)):

The cases are decomposed into combinations of primitive features.

(7) *Decomposition of case features in German:*

- a. nominative = [-obj,-obl]
- b. accusative = [+obj,-obl]
- c. dative = [+obj,+obl]
- d. genitive = [-obj,+obl]

Consequence:

Nominative and accusative form a natural class.

Genitive and dative form a natural class.

Accusative and dative form a natural class.

Nominative and genitive form a natural class.

Nominative and dative do *not* form a natural class.

Accusative and genitive do *not* form a natural class.

*Alternative accounts of syncretism**Side remark:*

Deriving syncretism by (feature decomposition and) underspecification is a well-established research strategy. However, there are also other theoretical approaches to syncretism, including those in (8) (none of these alternative approaches is inherently incompatible with underspecification).

(8) *Alternative approaches:*a. *Paradigm geometry*

Refs.: Johnston (1996), McCreight & Chvany (1991), Plank (1991b), Postma (1998), Gallmann (2004).

The main idea is that syncretism are derivable from an appropriate placement of the various paradigm cells (e.g., adjacency of paradigm cells in appropriately revised, or designed, paradigms).

b. *Rules of referral*

Refs.: Zwicky (1985), Corbett & Fraser (1993), Stump (2001)

Rules of referral state the identity of markers but make no further attempt to actually derive it.

c. *Impoverishment rules*

Refs.: Bonet (1991), Noyer (1992, 1998), Halle & Marantz (1993, 1994), Bobaljik (2002b), Frampton (2002)

Impoverishment rules are a central building block of Distributed Morphology. Impoverishment rules reduce morpho-syntactic feature specifications on the way from syntax to morphology; morphology then operates on simplified structures, and a *retreat to the general case* results.

Consequence of underspecification:

Underspecification typically has the effect of producing a *competition* of different markers for one and the same morpho-syntactic contexts.

1. Such a competition can be resolved by invoking an *extrinsic ordering* of inflection markers (alternatively, of rules that introduce these markers).
Refs.: Bierwisch (1967), Wurzel (1987, 1998), Halle (1994).
2. An alternative (and conceptually far more attractive) concept relies on the notion of *specificity*. Cf. the *Subset Principle* (accompanied by a notion of specificity), the *Elsewhere Principle*, the *Blocking Principle*, *Panini's Principle*, the *Proper Inclusion Principle*, etc.
Refs.: Kiparsky (1973), DiSciullo & Williams (1987), Fanselow (1991), Anderson (1992), Lumsden (1992), Noyer (1992), Williams (1994), Halle (1997), Williams (1997), Wiese (1999), Stump (2001).

*A simple approach employing underspecification**Preliminary assumption:*

Assume as given (a) a stem and (b) the smallest set of fully specified morpho-syntactic feature structures for this stem encoding the range of possible word forms. This set includes both features that are inherent to the stem, like (for nouns) inflection class and gender, and features that are variable and non-inherent, like (for nouns) case and number. This information creates a paradigm whose cells need to be filled. For each pair of (a) and (b), the correct word form (or filled paradigm cell) is determined by choosing a compatible inflection marker according to the Subset Principle.

Subset Principle (and Specificity)(9) *Subset Principle:*

An inflection marker *F* is merged with a stem *S* for a fully specified feature structure *M* iff (i) and (ii) hold:

- (i) The morpho-syntactic features of *F* are a subset of the morpho-syntactic features of *M*.
- (ii) *F* is the most specific inflection marker among those that satisfy (i).

(10) *Specificity of Inflection Markers:*

An inflection marker F_i is more specific than an inflection marker F_j iff F_i has more (relevant) morpho-syntactic features than F_j .

Theories of Inflection

Stump (2001) devises a useful taxonomy of theories of inflection.

(11) *Stump's taxonomy of theories of inflection:*

| | |
|-------------|---------------|
| incremental | realizational |
| lexical | inferential |

1. *Incremental analysis:*

Inflection markers add morpho-syntactic features that would otherwise not be present on a word form.

2. *Realizational analysis:*

Inflection markers do not add morpho-syntactic features; all pieces of morpho-syntactic information is independently available.

3. *Lexical analysis:*

Inflection markers are associated with (possibly abstract) morphemes that exist independently, as separate objects in the mental lexicon.

4. *Inferential analysis:*

Inflection markers do not have morpheme status and do not exist independently, as separate objects.

Some theories

- (12) a. lexical-incremental:
Lieber (1992), Wunderlich (1996, 1997b,a) (Minimalist Morphology)
- b. lexical-realizational:
Halle & Marantz (1993, 1994) (Distributed Morphology)
- c. inferential-incremental:
hardly attested
- d. inferential-realizational:
Matthews (1991), Anderson (1992), Corbett & Fraser (1993), Aronoff (1994), Stump (2001), Blevins (2004) (word (or stem) and paradigm approaches)

Differences Abstracting away from underspecification, (13) shows different treatments.

- (13) a. Lexical approaches (incremental or realizational):
 $studentu_{[+N,+dat,+masc,-pl]}$
 $\Leftarrow /student/_{[+N,+masc,class[1]]} + /u/_{[+dat,+masc,-pl,class[1]]}$
 $diesem_{[+N,+dat,+masc,-pl]}$
 $\Leftarrow /dies/_{[+D]} + /em/_{[+dat,+masc,-pl]}$
- b. Inferential-realizational approaches:
 $studentu_{[+N,+dat,+masc,-pl]}$
 \Leftarrow word form of the stem /student/ for the specification [+dat,-pl]

$diesem_{[+D,+dat,+masc,-pl]}$
 \Leftarrow word form of the stem /dies/ for the specification [+dat,+masc,-pl]

Comment

The type of theory sketched above is lexical (i.e., inflection markers exist as separate objects) and realizational (i.e., inflection markers do not contribute new features that the word form would not have otherwise). However, as will become clear, this approach differs significantly from Distributed Morphology.

1.3 Distributed Morphology

Lit.: Halle & Marantz (1994, 1993)

1.3.1 Halle & Marantz (1994) on clitic object pronouns in Spanish

Goal:

Halle and Marantz set out to introduce some basic assumptions of Distributed Morphology on the basis of the system of clitic object pronouns in Spanish.

Question:

Where does the name *Distributed Morphology* come from?

Answer (Halle & Marantz (1993, 111-112&171)):

“We have called our approach *Distributed Morphology* (hereafter DM) to highlight the fact that the machinery of what traditionally has been called morphology is not concentrated in a single component of the grammar, but rather is distributed among several different components.”

“The term *Distributed Morphology* and the general view that it incorporates resulted from discussions with David Pesetsky.”

Assumption:

The basic element of morphology is the *vocabulary item*. A vocabulary item pairs phonological features on the one hand with morpho-syntactic (and semantic) features on the other. The latter features encode the possible *context of insertion* of the vocabulary item; the former is also sometimes called *signal*.

- (14) *Structure of vocabulary items:*
 /phonological features/ \leftrightarrow [morpho-syntactic features]

Three central assumptions of Distributed Morphology:

- (i) *late insertion*
- (ii) *underspecification*
- (iii) *syntactic hierarchical structure all the way down*

1.3.1.1 Late Insertion

(15) *Late Insertion:*

Morphology follows syntax; morphology realizes abstract syntactic structures. The syntax itself merely deals with abstract categories that are bundles of morpho-syntactic and semantic features: so-called *f-morphemes* (functional morphemes) and so-called *l-morphemes* (lexical morphemes).

[At least, late insertion holds for f-morphemes; as for l-morphemes, proponents of Distributed Morphology do not necessarily agree, and both options have been pursued in Distributed Morphology.]

Syntactic X^0 categories (i.e., morphemes) are morphologically realized by insertion of vocabulary items (*vocabulary insertion*, VI). This way, (f-) morphemes get phonological features.

Consequences of late insertion

Remark:

A crucial assumption is the distinction between (abstract) *morphemes* and (concrete) *vocabulary items* (inflection markers, inflectional exponents). This difference is not recognized in (standard) theories that rely on *early insertion*.

Observation:

In contrast to early insertion, late insertion leaves room for possible modifications of syntactic structures with their morpho-syntactic features before morphological realization (vocabulary insertion) takes place. One such operation that changes syntactic structures before morphology applies is *impoverishment*.

1.3.1.2 Underspecification

(16) *Underspecification:*

The morpho-syntactic features (which make up the ‘context of insertion’) of vocabulary items are often underspecified. Such an underspecification makes a simpler, more economical description of inflectional systems possible, and it significantly contributes to an account of instances of syncretism.

Remark:

As a consequence of underspecification, constraints are needed that regulate the correct insertion of vocabulary items and decide the competition between different vocabulary items in the case of conflict: Subset Principle, Specificity.

1.3.1.3 Syntactic Hierarchical Structure All the Way Down

(17) *Syntactic Hierarchical Structure All the Way Down:*

Morphological insertion is sensitive to syntactic operations that manipulate (f- or l-) morphemes and create word forms: head movement, syntactic lowering.

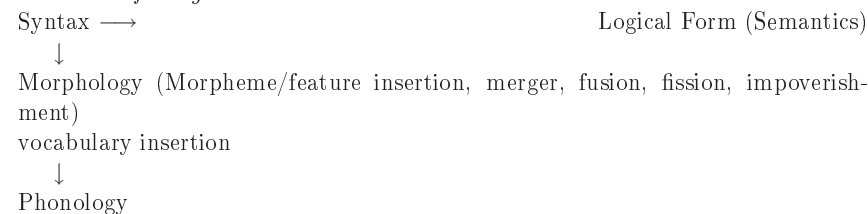
In addition, genuinely morphological operations (which apply after syntax but before insertion) manipulate syntactic items and respect syntactic principles (to a certain degree). Among these purely morphological operations are *merger*, *fusion*, *fission*, and *impoverishment*.

1.3.1.4 Structure of the Grammar

Observation:

In practise, Distributed Morphology typically (though not necessarily) envisages syntactic structures that employ many different functional categories. In that respect, the approach is very much compatible with a certain type of syntactic approach developed within the general Principles and Parameters framework (or, possibly, the Minimalist Program); see, e.g. studies based on *cartography*. (That said, in other respects, the approach will turn out not to be easily compatible with recent kinds of Chomskyan theories of syntax.)

(18) *Structure of the grammar:*



1.3.1.5 Impoverishment

An important concept: impoverishment:

Refs.: Bonet (1991), Noyer (1992, 1998), Halle & Marantz (1993, 1994), Bobaljik (2002b), Frampton (2002)

Impoverishment rules reduce morpho-syntactic feature bundles between syntax and morphology; rules of the morphological component (like vocabulary insertion) then operate on impoverished (simplified) structures, and this effects a *retreat to the general case*.

Note:

The classical concept of impoverishment fully corresponds to (and in a way complements) underspecification of vocabulary items:

- (i) underspecification of vocabulary items: “underspecification”
- (ii) underspecification of syntactic categories: “impoverishment”

1.3.1.6 Syntax vs. Morphology

Observation:

- (i) Normally, underspecification of morpho-syntactic features does not play any role whatsoever in the syntax.
- (ii) Therefore, impoverishment of syntactic structures can only apply *after* syntax has done its work.
- (iii) Hence, impoverishment (or, more generally, underspecification of syntactic structures) is possible only in theories that rely on late insertion.

1.3.1.7 Examples

(19) *An abstract example* (Halle & Marantz (1994)):

- a. *Category X:*
 - (i) $P_A \leftrightarrow [F_1, F_2]$ (vocabulary item A)
 - (ii) $P_B \leftrightarrow [F_1]$ (vocabulary item B)
- b. $[X F_1, F_2, F_3]$ (f-morpheme)
- c. $F_2 \rightarrow \emptyset / [X __ Y]$ (impoverishment)
- d. $[[X F_1, F_2, F_3] Y]$ (f-morpheme after impoverishment, before insertion)
- e. Insertion applies to P_B , not to P_A (even though the latter is more specific).

(20) *A concrete example: Adjectival markers in Norwegian* (Harley & Noyer (2003), Sauerland (1996)):

- a. *Vocabulary items:*
 - (i) $/t/ \leftrightarrow [-pl, +neut] / Adj __$
 - (ii) $\emptyset \leftrightarrow [-pl, -neut] / Adj __$
 - (iii) $/e/ \leftrightarrow [\] / Adj __$
- b. *Impoverishment:*
 - $[\pm neut] \rightarrow \emptyset$ in syntactic contexts with weak inflection

Paradigm 9: Adjectival markers in Norwegian

| | | |
|--------|-------------|---------|
| STRONG | [-neut] | [+neut] |
| [-pl] | \emptyset | /t/ |
| [+pl] | /e/ | /e/ |
| WEAK | [-neut] | [+neut] |
| [-pl] | /e/ | /e/ |
| [+pl] | /e/ | /e/ |

1.3.1.8 Clitic Object Pronouns in Spanish

- (21) *Structure of object clitics* (as with nouns):
 $[_{Det} [_{Det} Det Theme] Number]$

Assumption:

Vocabulary insertion applies cyclically, from left to right (from the stem to the edge), according to the *Subset Principle*.

Subset Principle and Specificity

(22) *Subset Principle* (Halle (1997)):

A vocabulary item V is inserted into a functional morpheme M iff (i) and (ii) hold:

- (i) The morpho-syntactic features of V are a subset of the morpho-syntactic features of M .
- (ii) V is the most specific vocabulary item that satisfies (i).

(23) *Specificity of vocabulary items:*

A vocabulary item V_i is more specific than a vocabulary item V_j iff V_i has more morpho-syntactic features than V_j .

Vocabulary Insertion 1: Det markers

(24) *Det markers* ('stems'):

- $/n/[I] \leftrightarrow [1.Pers] / __[+pl]$
- $/m/[III] \leftrightarrow [1.Pers]$
- $/\emptyset/ \leftrightarrow [2.Pers] / __[+pl]$
- $/t/[III] \leftrightarrow [2.Pers]$
- $/l/ \leftrightarrow [\] / __[case]$
- $/s/[III] \leftrightarrow [\]$

Assumption:

After insertion of the stems, but *before* insertion of theme vowels and number markers, the two *redundancy rules* in (25-a) and (25-b) apply, in this order.

(25) *Redundancy rules:*

- a. $[\] \rightarrow [III] / __[dat]$
- b. $[\] \rightarrow [II] / __[+fem]$

Remark:

At least redundancy rule (25-a) should possibly be understood in such a way that it applies only in the context [3.Pers]:

$$[\] \rightarrow [III] / __[dat], [3.Pers]$$

Otherwise, it seems that wrong predictions would be made for [2.Pers]-dative contexts. But see below.

Vocabulary Insertion 2: Theme vowels

(26) *Theme vowels and inflection class features:*

- $/e/ \leftrightarrow [III]$
- $/a/ \leftrightarrow [II]$
- $/o/ \leftrightarrow [\]$

Vocabulary Insertion 3: Number markers

(27) Number markers:

/s/ ↔ [+pl]
 (∅ ↔ [])

All Vocabulary Items

(28) Det markers ('stems'):

/n/[I] ↔ [1.Pers] /__[+pl]
 /m/[III] ↔ [1.Pers]
 /∅/ ↔ [2.Pers] /__[+pl]
 /t/[III] ↔ [2.Pers]
 /l/ ↔ [] /__[case]
 /s/[III] ↔ []

(29) Redundancy rules:

a. [] → [III] /__[dat,3.Pers]
 b. [] → [II] /__[+fem]

(30) Theme vowels and inflection class features:

/e/ ↔ [III]
 /a/ ↔ [II]
 /o/ ↔ []

(31) Number markers:

/s/ ↔ [+pl]
 (∅ ↔ [])

Paradigm 10: Clitic object pronouns in Spanish

| [-pl] | [3.Pers] | | [2.Pers] | [1.Pers] |
|-------|------------------|------------------|----------------|----------------|
| | [+masc] | [+fem] | | |
| Acc | /l/-/o/-∅ | /l/[III]-/a/-∅ | /t/[III]-/e/-∅ | /m/[III]-/e/-∅ |
| Dat | /l/[III]-/e/-∅ | /l/[III]-/e/-∅ | /t/[III]-/e/-∅ | /m/[III]-/e/-∅ |
| Refl | /s/[III]-/e/-∅ | /s/[III]-/e/-∅ | /t/[III]-/e/-∅ | /m/[III]-/e/-∅ |
| [+pl] | [3.Pers] | | [2.Pers] | [1.Pers] |
| | [+masc] | [+fem] | | |
| Acc | /l/-/o/-/s/ | /l/[II]-/a/-/s/ | ∅-/o/-/s/ | /n/[I]-/o/-/s/ |
| Dat | /l/[III]-/e/-/s/ | /l/[III]-/e/-/s/ | ∅-/o/-/s/ | /n/[I]-/o/-/s/ |
| Refl | /s/[III]-/e/-∅ | /s/[III]-/e/-∅ | ∅-/o/-/s/ | /n/[I]-/o/-/s/ |

1.3.1.9 Comments

Remark:

The inflection class features typeset in boldface in paradigm 10 do not come from inflection markers, but from the two redundancy rules.

Problem: How can the distribution of number markers be derived in the Refl-Plural domain?

Questions

- What is the theory-internal reason for the (few) differences between accusative and dative marking? And what is the reason for the (few) gender-related differences? *Not a single inflection marker (vocabulary item) bears case features; case features are only mentioned in redundancy rule (25-a). Similarly for gender features and (25-b).*
- The analysis involves a highly specific zero marker for stem positions. This assumption may not be completely unproblematic (from the point of view of iconicity at least). What is the theory-internal task of this zero marker? And why can the problem not be avoided by a slightly different specification of the context of insertion of some marker? How would the whole system have to be changed so as to be able to dispense with the highly specific zero marker? *The zero marker blocks /t/. /t/ could in principle be restricted to singular contexts; but then /l/ or /s/ would have to be inserted instead. Consequently, these latter markers would also have to be classified as incompatible with 2.Person contexts. Such an approach might eventually be viable, but it contradicts the assumption that one marker is usually radically underspecified. (We will come back to this issue.)*

Questions 2

- Inflection class [I] is the default class; the vocabulary item /o/ in (26) does not depend on the presence of this feature for insertion. Why, then, is the stem marker /n/ equipped with this feature in order to trigger subsequent /o/ insertion (in contrast to /l/ and /∅/). Perhaps this assumption can simply be dispensed with? *A problem can only arise if a redundancy rule can apply in this context that instantiates a different inflection class feature. By assumption, [+fem] is irrelevant for [1.Pers]; therefore, the only problem would be created by the dative-related rule (25-a). However, as noted above, this rule may only hold for [3.Pers] contexts; would it also apply in [2.Pers] contexts, ∅ would also need class information ([I]). Thus, the sole remaining scenario under which [I] would be needed for /n/ would be one where (25-a) holds for [1.Pers] [3.Pers], but not for [2.Pers].*
- Why do vocabulary insertion and the redundancy rules have to apply cyclically, from the center to the periphery? *Insertion of a stem marker and the two redundancy rules create the context for theme vowel insertion. Among the redundancy rules, the order of application is*

crucial; and similarly, the fact that both rules only apply after insertion of stem markers is very important.

1.3.1.10 Observations

First observation:

In American varieties of Spanish, the clitic pronoun /os/ for 2. person plural contexts is missing.

Analysis:

This can be traced back to *impoverishment rule*.

(32) *Impoverishment rule for [2.Pers]:*

[2.Pers] → ∅ / [+pl]

Consequence:

There is a *retreat to the general case*: In the plural, the [2.Pers] features is deleted. Therefore, ∅ cannot be inserted, and the same goes for /t/. As a result, the most specific remaining stem marker is /l/. Consequently, /los/ shows up in the context [2.Pers,+pl,Acc]. Still, to ensure that the output form is /les/ and not /los/ in [2.Pers.,+pl,Dat] contexts, (25-a) needs to be able to apply before theme vowel insertion. (In this context, Halle & Marantz (1994, 283) state: “Note also that like other 3. Person clitics and unlike its singular counterpart, the erstwhile 2. Person Plural clitic is subject to Case distinctions.”) This means that the redundancy rule at hand cannot be confined to 3. Person. No problem arises if [3.Pers] is characterized by an absence of features.

Second observation:

“Spurious *se*”: *se* shows up if a clitic 3. Person Dative pronoun is adjacent to a clitic 3. Person Accusative pronoun.

Analysis:

Again, an impoverishment rule is at work.

(33) *Impoverishment rule for [Dative]:*

[Dat] → ∅ / ___ [+Acc]

Consequence:

In Acc-Dat contexts, /l/ is blocked for the dative position because there is no case feature left. Therefore, the maximally nonspecific form /s/ is used.

Spurious ‘se’

(34) *Spurious se* (based on Bonet (1995)):

a. el premio, *lo* dieron a Pedro ayer
the price [3.Acc] have[3.Pl] to Pedro yesterday

- b. A Pedro, *le* dieron el premio ayer
to Pedro [3.Dat] gave[3.Pl] the price yesterday
- c. A Pedro, el premio *se lo* dieron ayer (**le lo, *lo le*)
to Pedro the price *se* [3.acc] gave[3.Pl] yesterday
‘Yesterday, they gave Pedro the price.’

Interaction of impoverishment rules

Prediction:

The two impoverishment rules just discussed can interact in varieties of American Spanish.

- (35) [2.Pers,Dat]+Theme+[+pl] & [3.Pers,Acc]+Theme+[-pl]
⇒ []+Theme+[+pl] & [3.Pers,Acc]+Theme+[-pl]
- a. *European Spanish:*
Os lo di ‘I gave it to you.’
- b. *American Spanish:*
Se lo di ‘I gave it to you.’

Syntactic structure all the way down:

So far, we have evidence for (i) late insertion (because of impoverishment) and (ii) underspecification (motivated by syncretism). What’s still missing is evidence for (iii) syntactic hierarchical structure all the way down. The argument can be provided on the basis of Spanish *imperatives*, which may co-occur with clitic object pronouns.

(36) *2.Pers.Plural imperatives with clitic pronouns, Spanish mit klitischen Pronomina, Standard-Spanisch:*

- a. d- e- n- l- o- s
give IMP 2.PL 3. ACC THEME PL
‘You give them (to someone).’
- b. d- e- n- m- e- l- o
give IMP 2.PL 1.DAT THEME 3.ACC THEME
‘You give it to me!’

(37) *2.Pers.Plural imperatives with clitic pronouns, Carribean Spanish :*

- a. d- e- n- l- o- s
give IMP 2.PL 3. ACC THEME PL
‘You give them (to someone).’
- b. d- e- m- e- l- o- n
give IMP 1.DAT THEME 3.ACC THEME 2.PL
‘You give it to me!’

Generalization:

In Carribean Spanish (or, more precisely, a version thereof), clitic pronouns that have no plural suffix end up in the middle of the imperative verb – after the imperative marker, but before the plural suffix of the verb.

In the syntax, there is a functional head *Case* and a functional head *Number* in nominal domains. In the case of fusional noun inflection in Indo-European languages, there is post-syntactic fusion of the two heads into a single morpheme.

Fission

(44) *Fission*; based on Halle & Marantz (1993, 166ff):

- a. Fission separates a feature bundle β from a terminal node (morpheme) M_α , such that two terminal nodes M_1 and M_2 come into existence.
- b. M_1 has the features β ; M_2 has the features of $M_\alpha - \beta$.

Note:

For Halle and Marantz, fission is the opposite of fusion: It takes a single morpheme and creates two morphemes by splitting of features.

Side remark:

The concept of *fission* in Noyer (1992) is different. (Noyer's version may be a bit more widely adopted in the recent literature.)

The two concepts of fission

(45) *Fission_a* (Halle & Marantz (1993)):

- a. Fission separates a feature bundle β from a terminal node (morpheme) M_α , such that two terminal nodes M_1 and M_2 come into existence.
- b. M_1 has the features β ; M_2 has the features of $M_\alpha - \beta$.

(46) *Fission_b* (Noyer (1992)): If insertion of a vocabulary item V with the morpho-syntactic features β takes place into a fissioned morpheme M with the morpho-syntactic features α , then α is split up into β and $\alpha - \beta$, such that (a) and (b) hold:

- a. $\alpha - \beta$ is available for further vocabulary insertion.
- b. β is not available for further vocabulary insertion.

1.3.3 Verb Agreement in Georgian

Example:

Agreement markers on the verb in Georgian (based on Anderson (1992); also see Stump (2001)). Halle & Marantz (1993, 116ff) analyse the agreement marking on the verb by presupposing functional clitic morphemes that have undergone fusion.

(47) *Paradigm*

With a 3.Pers object – X paints 3.Pers.:

- | | |
|-------------------------|--------------------------------|
| a. v-xatav | “I paint him.” |
| b. v-xatav-t | “We paint him.” |
| c. \emptyset -xatav | “You _{sg} paint him.” |
| d. \emptyset -xatav-t | “You _{pl} paint him.” |

- | | |
|------------------|--|
| e. xatav-s | “He paints him.” |
| f. xatav-en | “They paint him.” |
| | <i>With a 3.Pers subject – 3.Pers. paints X</i> |
| g. m-xatav-s | “He paints me.” |
| h. gv-xatav-s | “He paints us.” |
| i. g-xatav-s | “He paints you _{sg} .” |
| j. g-xatav-(s)-t | “He paints you _{pl} .” |
| k. xatav-s | “He paints him.” |
| l. xatav-s | “He paints them.” |
| | <i>With 1.Pers. and 2.Pers. – 1.Pers. paints 2.Pers. or 2.Pers. paints 1.Pers.</i> |
| m. g-xatav | “I paint you.” |
| n. m-xatav | “You paint me.” |
| o. g-xatav-t | “We paint you _{sg} /you _{pl} .” |
| | <i>or</i> |
| p. gv-xatav | “You _{sg} paint us.” |
| q. gv-xatav-t | “You _{pl} paint us.” |

Fusion \rightarrow *fission* \rightarrow *insertion*

Assumptions about fusion:

- (i) The clitic cluster incorporates, under a single head, all pronominal 1.Pers and 2.Pers arguments (normally, this does not hold for 3.person arguments; there are exceptions that will be ignored here).
- (ii) The terminal nodes in the clitic cluster fuse into a single terminal node.
- (iii) After fusion, the rule of fission in (48) applies.
- (iv) Finally, vocabulary insertion takes place.

(48) *Fission of clitic clusters in Georgian:*

[Cl ... [+pl] ...] + stem \rightarrow [+pl] + Cl + stem, where

- a. linear order is irrelevant; and
- b. fission does not apply if [+pl] is part of an argument bearing the features [+1],[DAT].

Further assumptions

1. A fused T/Agr-head (tense/agreement head) follows the clitic cluster and the verb stem. This head agrees with a [NOM]-marked argument with respect to person and number. the vocabulary items that are inserted in T/Agr are organised according to so-called “screeves”. (“Screeves”: loanword from Georgian; specific conjugation patterns that are roughly comparable to tenses.)
2. A (phonologically oriented) *readjustment rule* applying after vocabulary insertion deletes an /-s/ with 3.Pers.Sg. before a plural /-t/.
3. An *impoverishment rule* deletes a terminal plural-node if the latter follows some T/Agr-node with the features [+3],[+pl].

Vocabulary items

(49) Vocabulary items for clitic positions:

- a. /gv-/ ↔ [+1],[DAT],[+pl]
- b. /m-/ ↔ [+1],[DAT]
- c. /g-/ ↔ [+2],[DAT]
- d. /v-/ ↔ [+1]
- e. Ø ↔ [+2]

(5) Vocabulary items for plural:

- f. /-t/ ↔ [+pl]

(50) Vocabulary items for T/Agr in the examples above:

- a. Ø ↔ [+1] oder [+2]
- b. /-s/ ↔ [+3],[−pl]
- c. /-en/ ↔ [+3],[+pl]

Specificity problems

Question:

It is really clear whether the competition of vocabulary items in (49) can always be resolved by specificity. As noted by Halle and Marantz, additional assumptions may be called for for cases like (49), for the choice of (b) vs. (c) (in other contexts, where “both sets [in a clitic cluster] in principle might be DAT”; Halle & Marantz (1993, 120)). A similar reasoning applies in the case of (d) vs. (e). Halle and Marantz consider two options.

1. Specificity is sensitive to appropriate feature hierarchies, here:
[+1] > [+2].

2. There is an extrinsic ordering of vocabulary items.

Stump's Critique

Side Remark:

Stump (2001, 281, fn.3) claims that Halle & Marantz (1993) need an extrinsic ordering in their analysis of verb agreement in Georgian: “The ordering of /g-/ before /v-/ [...] is just stipulated.” This does not have to be the case: the vocabulary item /g-/ in (49) has more features in its context of insertion than the vocabulary item /v-/ in (49).

(An indeterminacy with respect to specificity could only arise if an element α can only be more specific than another element β if the features of α are a proper superset of the features of β . Something along these lines has indeed been proposed, but it is not the case under present assumptions.)

Syntax

(51) Syntactic structure for vocabulary insertion:

- $$\begin{array}{cccc}
 1 & & 2 & 3 & 4 \\
 [_{\text{Cl}} \{ \text{Pers.}, \text{CASE}, \text{NUM} \} & \{ \text{Pers.}, \text{CASE}, \text{NUM} \} &] & [\text{stem}] & [\text{T/Agr}] & [+pl]
 \end{array}$$

Remarks on (51):

1. Position 1 contains the clitic cluster and up to two case and Φ feature bundles (1. or 2. Person).
2. Position 2 encodes the verb stem.
3. Position 3 contains a case and Φ feature bundle that realizes agreement with the subject (i.e., the nominative-marked argument).
4. Position 4 is only activated under fission. By assumption, it does not have to be stipulated that the [+pl] feature that has been split off from the clitic cluster is realized as a (final) suffix; this is supposed to follow from the suffixal status of the vocabulary item /-t/, which is the only one that fits in this context.

Derived paradigm for xatav in Georgian:

| Subj→ Obj↓ | 1.Sg. | 1.Pl. | 2.Sg. | 2.Pl. | 3.Sg. | 3.Pl. |
|---------------|-----------|-----------|------------|------------|--------------|-------------|
| 1.Sg. | – | – | m-xatav-Ø | m-xatav-t | m-xatav-s | m-xatav-en |
| 1.Pl. | – | – | gv-xatav-Ø | gv-xatav-t | gv-xatav-s | gv-xatav-en |
| 2.Sg. | g-xatav-Ø | g-xatav-t | – | – | g-xatav-s | g-xatav-en |
| 2.Pl. | g-xatav-t | g-xatav-t | – | – | g-xatav-(s)t | g-xatav-en |
| 3.Sg. | v-xatav-Ø | v-xatav-t | Ø-xatav-Ø | Ø-xatav-t | Ø-xatav-s | Ø-xatav-en |
| 3.Pl. | v-xatav-Ø | v-xatav-t | Ø-xatav-Ø | Ø-xatav-t | Ø-xatav-s | Ø-xatav-en |

Comments:

- /-s/ in 3.Sg.→2.Pl. contexts is deleted via readjustment.
- In 1.Pl.→2.Pl. context, there should be two /-t/ markers if nothing else is said.
- In (e.g.) 1.Sg.→3.Pl. or 2.Sg.→3.Pl. contexts, there is no /-t/ because 3.Pers. clitics do not undergo incorporation.
Alternative (?): [±pl]-impoverishment with 3.Pers. in the clitic cluster.

Conclusion: Georgian verb agreement

Conclusion:

- *Fusion* is needed in this approach because two arguments need to be encoded in transitive contexts in Georgian, but evidently, there is only enough space for the encoding of one argument in the relevant position in front of the verb.
- *Fission* is needed in this approach because the argument that has “lost” in the pre-verbal (and is not encoded there) can at least be encoded with respect to number, in the post-verbal position (see 1.Pers.Pl.→2.Pers.Sg.: *g-xatav-t*).

1.3.4 Fission

Refs.: Frampton (2002)

1.3.4.1 Basic Assumptions

Central claims:

(i) Person features as they are standardly assumed (1, 2, 3) for verbal conjugations must be decomposed into combinations of more primitive features $[\pm 1]$, $[\pm 2]$. Vocabulary items can be underspecified with respect to these features. This captures instances of person syncretism.

(ii) The analysis requires post-syntactic operations: impoverishment and fission. As far as it can count as successful, it therefore provides an argument for Distributed Morphology.

(52) *Impoverishment:*

Impoverishment rules reduce morpho-syntactic feature bundles on the way from syntax to morphology; morphology then operates on simplified, “impoverished” structures, and we get a *retreat to the general case*.

Remark:

The concept of impoverishment employed here is the standard one. In contrast, fission is defined as in Halle & Marantz (1993) (*fission_a*), but rather as in Noyer (1992) (also see Trommer (1999a,b)).

(53) *Fission_a* (Halle & Marantz (1993)):

- a. Fission separates a feature bundle β from a terminal node (morpheme) M_α , such that two terminal nodes M_1 and M_2 come into existence.
- b. M_1 has the features β ; M_2 has the features of $M_\alpha - \beta$.

(54) *Fission_b* (Noyer (1992)): If insertion of a vocabulary item V with the morpho-syntactic features β takes place into a fissioned morpheme M with the morpho-syntactic features α , then α is split up into β and $\alpha - \beta$, such that (a) and (b) hold:

- a. $\alpha - \beta$ is available for further vocabulary insertion.
- b. β is not available for further vocabulary insertion.

Note:

Fission of a morpheme is recursive; i.e., after insertion of a vocabulary item, a morpheme (assuming that it has morpho-syntactic features left) is again subject to fission, and so on (until no features are left).

(55) *Subset Principle* (Halle (1997)):

A vocabulary item V is inserted into a functional morpheme M iff (i) and (ii) hold:

- (i) The morpho-syntactic features of V are a subset of the morpho-syntactic features of M .

- (ii) V is the most specific vocabulary item that satisfies (i).

Terminological remark:

Frampton calls this principle the “Principle of Decreasing Specificity” (PDS).

(56) *Specificity of vocabulary items:*

A vocabulary item V_i is more specific than a vocabulary item V_j iff V_i has more morpho-syntactic features than V_j .

1.3.4.2 Syncretism in English Verb Inflection

(57) a. *be*

| | pres | past |
|------|------|------|
| 1 sg | am | was |
| 2 sg | are | were |
| 3 sg | is | was |
| 1 pl | are | were |
| 2 pl | are | were |
| 3 pl | are | were |

b. *work*

| | pres | past |
|------|-------|--------|
| 1 sg | work | worked |
| 2 sg | work | worked |
| 3 sg | works | worked |
| 1 pl | work | worked |
| 2 pl | work | worked |
| 3 pl | work | worked |

(58) *Generalizations:*

- a. In past tense contexts, there is a syncretism of 1.Pers.Sg. and 3.Pers.Sg.
- b. In the plural, there are no person distinctions.

Assumption:

These two generalizations are not accidental. Therefore, they should not follow from arbitrary properties of vocabulary items. Rather, they should be derived from impoverishment rules that systematically reduce and simplify syntactic features structures for the purposes of morphological realization. Consequently, certain kinds of syncretism can be classified as system-defining properties.

Observation:

At least the 1./3. syncretism is a fundamental property of all Germanic languages. (It holds in Gothic, German, Icelandic, etc.)

Basic problem:

How can the 1./3. syncretism be derived by invoking the concept of natural classes of persons?

Plank (1991a, 19):

This shows that syncretism can show up without any “similarity in meaning”; the reason would be that 1. and 3.Pers. intuitively do not form a natural class (“no natural class on any plausible criterion”).

Assumption (Wiese (1994)):

1. and 3.Pers. are indeed a natural class (that can then be referred to by inflection markers via underspecification); the only thing that needs to be done is to decompose inflection markers accordingly.

(59) *Decomposition of inflection markers in Wiese's work:*

- a. [\pm demonstrative]
- b. [\pm addressing]

(60) *Persons in Wiese's system:*

- a. [$-d,-a$] = 1. Pers.
- b. [$+d,+a$] = 2. Pers.
- c. [$+d,-a$] = 3. Pers.
- d. [$-d,+a$] = - (1. Pers. incl.?)

Result:

1. and 3. Person form a natural class: [$-$ addressing]

Note:

Independently, Frampton suggests a similar decomposition (based on work by Noyer (1992)).

(61) *Decomposition of person features in Frampton's analysis:*

- a. [± 1]
- b. [± 2]

Consequently:

- (i) [$+a$] in Wiese's system = [$+2$]
- (ii) [$-a$] in Wiese's system = [-2] in Frampton's system
- (iii) [$+d$] in Wiese's system = [-1] in Frampton's system
- (iv) [$-d$] in Wiese's system = [$+1$] in Frampton's system

Result:

Again, 1.Person and 3.Person form a natural class: [-2].

(62) *Persons in Frampton's system:*

- a. [$+1,-2$] = 1. Pers.
- b. [$-1,+2$] = 2. Pers.
- c. [$-1,-2$] = 3. Pers.
- d. [$+1,+2$] = 1. Pers. inkl.

Note:

In Frampton's analysis, the primitive features are given semantic interpretations; whether [$+1,+2$] can be interpreted in a coherent way is assumed to be subject to language-specific parametrization. In (e.g.) Indo-European languages, the combination is not available, due to a lack of semantic coherence.

Side remark:

As will be discussed in chapter 4 below, the system of decomposed person features is not yet adequate to account for all cases of person syncretism that have been observed in the literature (for concreteness, there is good evidence that 1. and 2.Person also form a natural class). We can ignore this complication for the time being.

(63) *Vocabulary items: 'be':*

- a. /am/ \leftrightarrow [$+1,-2,-pl,-past$]
- b. /I/ \leftrightarrow [$-2,-pl,-past$]
- c. /are/ \leftrightarrow [$-past$]
- d. /was/ \leftrightarrow [$-2,-pl,+past$]
- e. /were/ \leftrightarrow [$+past$]

Problem:

The syncretism is now derivable by decomposing person features, but it is analyzed as going back to an arbitrary lexical entry (cf. (63-d)) rather than as a system-wide generalization.

Assumptions about syntactic structure

(64) a. *Simplified clause structure before head movement:*

[_{AgrP} [_{Agr'} Agr [_{TP} [_{T'} T [_{VP} ... V ...]]]]]

b. *Result of head movement:*

[_{Agr} [_T V T] Agr]

Note:

This generates the abstract paradigms in (65). (These abstract paradigms are not to be viewed as genuine objects of the grammar; they have the status of generalizations about which fully specified categories need to be filled by vocabulary insertion. In line with virtually all work carried out in Distributed Morphology, Frampton assumes that paradigms are not entities that morphological constraints can refer to.)

(65) *Specifications that need to be realized by vocabulary items, version 1:*

- a. V + [$-past$] +

| | |
|-----------------|-----------------|
| [$+1,-2,-pl$] | [$+1,-2,+pl$] |
| [$-1,+2,-pl$] | [$+1,+2,+pl$] |
| [$-1,-2,-pl$] | [$-1,-2,+pl$] |
- b. V + [$+past$] +

| | |
|-----------------|-----------------|
| [$+1,-2,-pl$] | [$+1,-2,+pl$] |
| [$-1,+2,-pl$] | [$+1,+2,+pl$] |
| [$-1,-2,-pl$] | [$-1,-2,+pl$] |

Assumption:

(65) is simplified by impoverishment.

(66) *Impoverishment for plural contexts in English:*

[$\pm 1,\pm 2$] \rightarrow \emptyset /___[$+pl$]

(67) *Specifications that need to be realized by vocabulary items, version 2 (after impoverishment):*

- a. $V + [-\text{past}] + \begin{bmatrix} [+1,-2,-\text{pl}] [+ \text{pl}] \\ [-1,+2,-\text{pl}] [+ \text{pl}] \\ [-1,-2,-\text{pl}] [+ \text{pl}] \end{bmatrix}$
- b. $V + [+ \text{past}] + \begin{bmatrix} [+1,-2,-\text{pl}] [+ \text{pl}] \\ [-1,+2,-\text{pl}] [+ \text{pl}] \\ [-1,-2,-\text{pl}] [+ \text{pl}] \end{bmatrix}$

Consequence:

There can be no vocabulary items that are sensitive to person differences in the plural (or if there are, they will never be able to surface).

1.3.4.3 Syncretism in Old English Verb Inflection

(68) Weak verbs: *dēmen* ('deem')

| | pres | past |
|-----------------------|---------|-----------|
| $[+1,-2,-\text{pl}]$ | dēm-e | dēm-d-e |
| $[-1,+2,-\text{pl}]$ | dēm-est | dēm-d-est |
| $[-1,-2,-\text{pl}]$ | dēm-eþ | dēm-d-e |
| $[+1,-2,+ \text{pl}]$ | dēm-aþ | dēm-d-on |
| $[-1,+2,+ \text{pl}]$ | dēm-aþ | dēm-d-on |
| $[-1,-2,+ \text{pl}]$ | dēm-aþ | dēm-d-on |

(69) Strong verbs: *singan* ('sing')

| | pres | past |
|-----------------------|----------|---------|
| $[+1,-2,-\text{pl}]$ | sing-e | sang |
| $[-1,+2,-\text{pl}]$ | sing-est | sung-e |
| $[-1,-2,-\text{pl}]$ | sing-eþ | sang |
| $[+1,-2,+ \text{pl}]$ | sing-aþ | sung-on |
| $[-1,+2,+ \text{pl}]$ | sing-aþ | sung-on |
| $[-1,-2,+ \text{pl}]$ | sing-aþ | sung-on |

(70) Suppletive verbs: *sindon* ('be')

| | pres | past |
|-----------------------|--------|--------|
| $[+1,-2,-\text{pl}]$ | eam | wæs |
| $[-1,+2,-\text{pl}]$ | eart | wær-e |
| $[-1,-2,-\text{pl}]$ | is | wæs |
| $[+1,-2,+ \text{pl}]$ | sindon | wær-on |
| $[-1,+2,+ \text{pl}]$ | sindon | wær-on |
| $[-1,-2,+ \text{pl}]$ | sindon | wær-on |

Assumption:

The instances of systematic syncretism in the plural, and with 1. and 3. Pers. Sg. in past tense contexts, are to be derived by involving impoverishment rules.

(71) *Impoverishment:*

- $[+\text{past}]$ becomes a privative feature $[\text{past}]$, $[-\text{past}]$ is deleted.
- $[+\text{pl}]$ becomes a privative feature $[\text{pl}]$, $[-\text{pl}]$ is deleted.
- $[\pm 1] \rightarrow \emptyset / [\text{past}] _$.
- $[\pm 1, \pm 2] \rightarrow \emptyset / _ [\text{pl}]$.

Note:

(71-cd) are the important rules.

(It is not fully clear to me whether (71-ab) are needed at all. Frampton introduces these rules as 'privativization rules', but it seems that we are dealing with impoverishment rules here.)

Consequence:

From (65), we don't just get (67); rather, we get the abstract paradigm (72). (72) exhaustively defines the possible insertion contexts for Old English verb inflection markers.

(72) *Specifications that need to be realized by vocabulary items, version 3 (after privativization and two applications of impoverishment):*

- $V + \begin{bmatrix} [+1,-2] [\text{pl}] \\ [-1,+2] [\text{pl}] \\ [-1,-2] [\text{pl}] \end{bmatrix}$
- $V + [\text{past}] + \begin{bmatrix} [-2] [\text{pl}] \\ [+2] [\text{pl}] \\ [-2] [\text{pl}] \end{bmatrix}$

(73) *Vocabulary items:*

- $/\text{wæs}/ \leftrightarrow \text{indon} / _ [-2, \text{past}]$
- $/\text{wær}/ \leftrightarrow \text{indon} / _ [\text{past}]$
- $\emptyset \leftrightarrow [\text{past}] / V_{\text{strong}} _$
- $/\text{d}/ \leftrightarrow [\text{past}]$
- $\emptyset \leftrightarrow [-2] / V_{\text{strong}}, [\text{past}] _$
- $/\text{e}/ \leftrightarrow [+2] / V_{\text{strong}}, [\text{past}] _$
- $/\text{eþ}/ \leftrightarrow [-1,-2]$
- $/\text{est}/ \leftrightarrow [+2]$
- $/\text{e}/ \leftrightarrow [-2]$
- $/\text{on}/ \leftrightarrow [\text{pl}] / [\text{past}] _$
- $/\text{aþ}/ \leftrightarrow [\text{pl}]$

- (74) a. $V + \begin{bmatrix} [+1,-2] [\text{pl}] \\ [-1,+2] [\text{pl}] \\ [-1,-2] [\text{pl}] \end{bmatrix}$ b. $V + [\text{past}] + \begin{bmatrix} [-2] [\text{pl}] \\ [+2] [\text{pl}] \\ [-2] [\text{pl}] \end{bmatrix}$

Problem:

Why are no inflection markers inserted with suppletive forms of *sindon* in the present tense?

Solution:

sindon (= V) and Agr fuse when they are adjacent (i.e., if T[past] does not intervene).

- (75) a. /eam/ ↔ *sindon*, [+1, -2]
 b. /eart/ ↔ *sindon*, [+2]
 c. /is/ ↔ *sindon*, [-2]
 d. /sindon/ ↔ *sindon*, [pl]

Complexity:

Frampton notes that, given the Subset Principle, (a) first the vocabulary items have to be determined that fit into a given context, and (b) then the most specific marker (among those that are compatible) must be determined. Assuming impoverishment, both processes are substantially shorter. Therefore (so the idea), a theory that employs impoverishment is attractive, and preferable, from the point of view of complexity (other things being equal).

1.3.4.4 Syncretism in German Verb Inflection

(76) Weak verbs: *believe*

| | pres | past |
|---------------|----------|-------------|
| [+1, -2, -pl] | glaub-e | glaub-te |
| [-1, +2, -pl] | glaub-st | glaub-te-st |
| [-1, -2, -pl] | glaub-t | glaub-te |
| [+1, -2, +pl] | glaub-en | glaub-te-n |
| [-1, +2, +pl] | glaub-t | glaub-te-t |
| [-1, -2, +pl] | glaub-en | glaub-te-n |

(77) Strong verbs: *sing*

| | pres | past |
|---------------|---------|---------|
| [+1, -2, -pl] | sing-e | sang |
| [-1, +2, -pl] | sing-st | sang-st |
| [-1, -2, -pl] | sing-t | sang |
| [+1, -2, +pl] | sing-en | sang-en |
| [-1, +2, +pl] | sing-t | sang-t |
| [-1, -2, +pl] | sing-en | sang-en |

(78) Suppletive verbs: *be*

| | pres | past |
|---------------|-------|--------|
| [+1, -2, -pl] | bin | war |
| [-1, +2, -pl] | bi-st | war-st |
| [-1, -2, -pl] | is-t | war |
| [+1, -2, +pl] | sind | war-en |
| [-1, +2, +pl] | seid | war-t |
| [-1, -2, +pl] | sind | war-en |

(79) *Impoverishment rules, German:*

- a. [+past] becomes a privative feature [past], [-past] is deleted.
 b. [+pl] becomes a privative feature feature [pl], [-pl] is deleted.
 c. [±1] → ∅/[past]__.
 d. [±1] → ∅/__[pl].

(80) *Specifications that need to be realized by vocabulary items (after privatization and two applications of impoverishment):*

- a. V +

| | |
|----------|----------|
| [+1, -2] | [-2, pl] |
| [-1, +2] | [+2, pl] |
| [-1, -2] | [-2, pl] |

 b. V + [past] +

| | |
|------|----------|
| [-2] | [-2, pl] |
| [+2] | [+2, pl] |
| [-2] | [-2, pl] |

(81) *Vocabulary items:*

- a. ∅ ↔ [past]/V_{strong}__
 b. /te/ ↔ [past]
 c. /e/ ↔ [+1, -2]
 d. /t/ ↔ [-1, -2]
 e. /n/ ↔ [-2, pl]
 f. /t/ ↔ [+2, pl]
 g. /st/ ↔ [+2]

- (82) a. V +

| | |
|----------|----------|
| [+1, -2] | [-2, pl] |
| [-1, +2] | [+2, pl] |
| [-1, -2] | [-2, pl] |

 b. V + [past] +

| | |
|------|----------|
| [-2] | [-2, pl] |
| [+2] | [+2, pl] |
| [-2] | [-2, pl] |

1.3.4.5 Kabyle-Berber

Language: Afro-Asiatic, Algeria

Plot:

There is no evidence for impoverishment here in the domain of conjugation, but there is evidence for (i) the decomposition of person features, and (ii) fission.

(83) *Fission_b* (Noyer (1992)): If insertion of a vocabulary item V with the morpho-syntactic features β takes place into a fissioned morpheme M with the morpho-syntactic features α, then α is split up into β and α-β, such that (a) and (b) hold:

- a. α-β is available for further vocabulary insertion.
 b. β is not available for further vocabulary insertion.

(84) *Completive verbal paradigm:*

| | sg | pl |
|-------|-----------|------------|
| 1masc | wala-ŷ | n-wala |
| 1fem | wala-ŷ | n-wala |
| 2masc | t-wala-d' | t-wala-m |
| 2fem | t-wala-d' | t-wala-m-t |
| 3masc | i-wala | wala-n |
| 3fem | t-wala | wala-n-t |

(85) *Abstract paradigm:*

| | | |
|-----|------------------|------------------|
| V + | [+1,-2,-pl,-fem] | [+1,-2,+pl,-fem] |
| | [+1,-2,-pl,+fem] | [+1,-2,+pl,+fem] |
| | [-1,+2,-pl,-fem] | [-1,+2,+pl,-fem] |
| | [-1,+2,-pl,+fem] | [-1,+2,+pl,+fem] |
| | [-1,-2,-pl,-fem] | [-1,-2,+pl,-fem] |
| | [-1,-2,-pl,+fem] | [-1,-2,+pl,+fem] |

Note:

For every vocabulary item, it must be listed whether it is a suffix or a prefix (indicated by a hyphen accompanying the exponent in question).

(86) *Vocabulary items:*

- /i-/ ↔ [-1,-2,-pl,-fem]
- /-n/ ↔ [-1,-2,+pl]
- /n-/ ↔ [+1,+pl]
- /-ŷ/ ↔ [+1]
- /-m/ ↔ [+2,+pl]
- /-d'/ ↔ [+2]
- /t-/ ↔ [-1]
- /-t/ ↔ [+fem]/[-1,+pl]__

Extension of Frampton's analysis in Müller (2006)

(5) a. *Weak verb inflection: believe* b. *verb inflection: call*

| | Present | Past |
|--------|----------|-------------|
| [1,sg] | glaub-e | glaub-te |
| [2,sg] | glaub-st | glaub-te-st |
| [3,sg] | glaub-t | glaub-te |
| [1,pl] | glaub-en | glaub-te-n |
| [2,pl] | glaub-t | glaub-te-t |
| [3,pl] | glaub-en | glaub-te-n |

| | Present | Past |
|--------|---------|---------|
| [1,sg] | ruf-e | rief |
| [2,sg] | ruf-st | rief-st |
| [3,sg] | ruf-t | rief |
| [1,pl] | ruf-en | rief-en |
| [2,pl] | ruf-t | rief-t |
| [3,pl] | ruf-en | rief-en |

c. *Suppletive verb inflection: sein*

| | Present | Past |
|--------|---------|--------|
| [1,sg] | bin | war |
| [2,sg] | bi-st | war-st |
| [3,sg] | is-t | war |
| [1,pl] | sind | war-en |
| [2,pl] | seid | war-t |
| [3,pl] | sind | war-en |

(87) *Two impoverishment rules for verb inflection in German:*

- [±1] → Ø/[-2,-pl,+past]__
- [±1] → Ø/[-2,+pl]__

(88) *Marker inventory:*

- /te/ ↔ [+past,-strong]
- /s/ ↔ [+2,-pl]
- /n/ ↔ [-2,+pl]
- /t/ ↔ [-1]
- /(e)/ ↔ []

(89) *Vocabulary insertion into impoverished T morphemes in German*

| T | [-past] | | T | [+past] | |
|-------------------------|-----------|-----------|-------------------------|--------------|-----------|
| | [-strong] | [+strong] | | [-strong] | [+strong] |
| [+1,-2,-pl] | /e/ | /e/ | [+1,-2,-pl] | /te/ | /Ø/ |
| [-1,+2,-pl] | /s/-/t/ | /s/-/t/ | [-1,+2,-pl] | /te/-/s/-/t/ | /s/-/t/ |
| [-1,-2,-pl] | /t/ | /t/ | [-1,-2,-pl] | /te/ | /Ø/ |
| [+1,-2,+pl] | /n/ | /n/ | [+1,-2,+pl] | /te/-/n/ | /n/ |
| [-1,+2,+pl] | /t/ | /t/ | [-1,+2,+pl] | /te/-/t/ | /t/ |
| [-1,-2,+pl] | /n/ | /n/ | [-1,-2,+pl] | /te/-/n/ | /n/ |

1.4 Paradigm Function Morphology

Lit.: Stump (2001)

1.4.1 Inferentiell-Realisationale Morphologie

Hintergrund Stump (2001) entwirft eine Taxonomie der Flexionstheorien.

(90) *Stumps Einteilung der Flexionstheorien:*

| | |
|--------------|---------------|
| inkrementell | realisational |
| lexikalisch | inferentiell |

1. *Inkrementelle Analyse:*

Flexionsmarker tragen morpho-syntaktische Merkmale bei, die ansonsten nicht da sind.

2. *Realisationale Analyse:*

Flexionsmarker tragen keine morpho-syntaktischen Merkmale bei; alle morpho-syntaktische Information ist unabhängig vorhanden.

3. *Lexikalische Analyse:*

Flexionsmarker sind korreliert mit (möglicherweise abstrakten) Morphemen, die als eigenständige Objekte im Lexikon existieren.

4. *Inferentielle Analyse:*

Flexionsmarker haben keinen Morphemstatus und existieren nicht als unabhängige Objekte.

Einige Theorien(91) *Einige Theorien:*

- a. lexikalisch-inkrementell:
Lieber (1992), Wunderlich (1996, 1997a) (Minimalistische Morphologie)
- b. lexikalisch-realisational:
Halle & Marantz (1993, 1994) (Distribuierte Morphologie)
- c. inferentiell-inkrementell:
kaum attestiert
- d. inferentiell-realisational:
Matthews (1991), Anderson (1992), Corbett & Fraser (1993), Aronoff (1994), Stump (2001), Blevins (2004) (Wort-(Stamm-)und-Paradigm-Ansätze)

Empirische Evidenz für realisationale Theorien 1: Erweiterte Exponenz(92) *Erweiterte Exponenz:*

Die morphosyntaktischen Eigenschaften, die mit einem flektierten Wort (einer Wortform) assoziiert sind, können durch mehr als einen Exponenten in der Morphologie des Wortes ausgedrückt werden.

(93) *Pluralbildung bei Diminutiva im Bretonischen:*

- a. bagig 'kleines Boot'
- b. bagoùigoù 'kleine Boote'

(94) *Negative Präteritumformen im Swahili:*

- a. tu-li-taka 'wir wollten'
 - b. ha-tu-ku-taka 'wir wollten nicht'
- ku = neg.prät, ha = neg.

(95) *Partizip 2 im Deutschen:*

- a. sprechen
- b. ge-sproch-en (3 Exponenten)

Empirische Evidenz für realisationale Theorien 2: Unterdeterminierung(96) *Unterdeterminierung:*

Die morphosyntaktischen Eigenschaften, die mit einem flektierten Wort (einer

Wortform) assoziiert sind, können die Eigenschaften, die mit dem Wort als ganzen assoziiert sind, unterdeterminieren.

(97) *Imperfekt und Aorist im Bulgarischen: krad ('stehlen'):*

| | <i>Imperfekt</i> | <i>Aorist</i> |
|-----|------------------|---------------|
| 1sg | krad-'á-x | krád-o-x |
| 2sg | krad-é-š-e | krád-e |
| 3sg | krad-é-š-e | krád-e |
| 1pl | krad-'á-x-me | krád-o-x-me |
| 2pl | krad-'á-x-te | krád-o-x-te |
| 3pl | krad-'á-x-a | krád-o-x-a |

Problem:

Was stellt in einem inkrementellen Ansatz sicher, dass eine Form wie *krad-'á-x* mit der morphosyntaktischen Eigenschaft 1.Pers.Sg.-Kongruenz assoziiert wird?

Standardlösung:

Ein leeres Suffix tut dies (bzw. eine Regel, die keine Formveränderung bewirkt).

Konzeptuelle Evidenz für realisationale Theorien: Inhalt vs. Kontext

Unerwünschte Ambiguität:

Ist eine morphosyntaktische Eigenschaft eines Flexionsmarkers eine Eigenschaft seines *Inhalts* oder eine Eigenschaft seines *Kontexts*?

Evidenz:

Im Bulgarischen gibt es eine Klasse von Verben, die ein besonderes Suffix *m* in der 1.Pers.Sg.Präs. haben: *dávam* ('ich gebe').

Entscheidungsproblem für die Analyse:

- (i) Ist *m* ein Suffix mit den Merkmalen 1.Pers.Sg., das einen Präsens-Stamm subkategorisiert?
- (ii) Ist *m* ein Suffix mit den Merkmalen 1.Pers.Sg.Präs.?

Ausweg:

Kein Problem in inferentiell-realisationalen Theorien, denn:

- (98) Exponenz ist die einzige Art der Assozierung von Flexionsmarkierung und morphosyntaktischen Eigenschaften.

Die Morphologie-Syntax-Schnittstelle(99) *Nullhypothese:*

Ein flektiertes Wort X der Kategorie Y, das mit einer Menge σ von morphosyntaktischen Eigenschaften assoziiert ist, wird als Kopf einer Phrase YP in der Syntax eingesetzt, deren morphosyntaktische Eigenschaften nicht von σ distinkt sind.

Beobachtung:

Es gibt vier mögliche Herausforderungen für diese Sichtweise:

- (i) Randeigenschaften
- (ii) Formalalternationen
- (iii) Superlexeme
- (iv) Periphrase

Randeigenschaften

- (100) Wenn X mit einer Randeigenschaft (rechts oder links) p assoziiert ist, dann wird X am (rechten oder linken) Rand einer Phrase eingesetzt, die p trägt.

Beispiel:

Ein Wort wie *children's* muss (a) wg. (100) am rechten Rand einer possessiven NP eingesetzt werden, und (b) wg. (99), als Kopf einer Plural NP eingesetzt werden.

Formalternationen

- (101) *Phonologisch bedingte Alternation beim indefiniten Artikel im Englischen:*

- a. a bird
- b. an apple

- (102) *Bretonische Väter:*

- a. ho tad 'euer Vater'
- b. e dad 'sein Vater'
- c. va zad 'mein Vater'

- (103) *Regeln:*

- a. Die Form *zad* wird eingesetzt nach einem Spirantisierungsauslöser wie *va*.
- b. Die Form *dad* wird eingesetzt nach einem Lenisierungsauslöser wie *e*.
- c. Die Form *tad* ist der elsewhere case.

*Superlexeme**Generalisierung:*

Eine morphologische Realisierung, mehrere (adjazente) syntaktische Positionen und morphosyntaktische Eigenschaften.

- (104) *Verschmelzungsformen:*

- a. zu der, zu dem
- b. zur, zum
- c. I would
- d. I'd

- (105) *Klammerparadoxe im Sanskrit:*

amhór uru-cákrih 'causing relief from distress'
 amhór 'distress' (abl.sg.)
 uru- 'relief'
 cákrih 'causing'

- a. *Syntaktische Struktur:*

[_{AP} [_{NP} [_{NP} amhór] [_N uru-]] cákrih]

- b. *Morphologische Struktur:*

[_N amhór] [_A [_N uru-] [_A cákrih]]

- (106) *Klammerparadoxe im Deutschen:*

- a. gekochte Schinkenplatte
- b. Genschers Beliebtheitskurve bei den Wählern

Periphrase

Es gibt in (synthetischen) Paradigmen oft Lücken, die systematisch durch analytische Formen aufgefüllt werden. Hier gilt:

Generalisierung:

Mehrere morphologische Realisierungen, ein morphosyntaktisches Merkmalsbündel (eine syntaktische Position?).

- (107) *Lateinische Verbflexion:*

- a. amat Präsens Aktiv: 'Er liebt'
- b. amator Präsens Passiv: 'Er wird geliebt'
- c. amavit Perfekt Aktiv: 'Er hat geliebt'
- d. amatus est Perfekt Passiv: 'Er ist geliebt worden'

1.4.2 Paradigmenfunktionen*Hintergrundannahmen 1*

- (108) *Grundannahme:*

Die Verknüpfung eines Wortes mit einer bestimmten Menge von morphosyntaktischen Eigenschaften determiniert eine Kette von Regelanwendungen, die die Flexionsform des Wortes bestimmen.

- (109) *Traditionelle Terminologie:*

- a. *Wort* ('Wort', 'Lexem'): z.B. BUCH; Wörter haben Paradigmen.
- b. *Wortform* ('Flexionsform des Wortes'): z.B. *Buches*; Wortformen sind Teile von Paradigmen.

- (110) *Paradigmen* (Behauptung):

In dieser Theorie sind Paradigmen keine Epiphänomene; vielmehr "konstituieren sie ein zentrales Prinzip der morphologischen Organisation". Paradigmen sind das Ergebnis von *Paradigmenfunktionen*

- (111) *Drei Typen morphologischer Ausdrücke:*

- a. *Wurzel* ('root'): die "ultimative Default-Form" eines Lexems (Wortes).
- b. *Stamm* ('stem'): ein Ausdruck, an den Flexionsexponenten angefügt werden können (jede Wurzel ist ein Stamm, nicht jeder Stamm ist eine Wurzel).

- c. *Wortform* ('word'(!)): eine freie, voll flektierte Form, die eine Paradigmenzelle besetzt

Hintergrundannahmen 2

- (112) *Realisierungsregeln*:
Paradigmenfunktionen werden durch speziellere Realisierungsregeln definiert.
- (113) Informelles Beispiel:
Der Wert der Paradigmenfunktion ($\langle \text{Mutter-}, \{\text{dativ, plural}\} \rangle$) ergibt sich aus dem Ergebnis der Anwendung zweier Realisationsregeln – einer, die die Umlautvariante des Stamms wählt, und einer, die *-n* suffigiert.

Terminologie:

$\langle \text{Mutter-}, \{\text{dativ, plural}\} \rangle$ ist ein *FPSP* ('form/property-set pairing').

- (114) *Regelblöcke*:
- Die Realisierungsregeln einer Sprache sind in Blöcke organisiert.
 - Regeln im selben Block konkurrieren miteinander; nur die spezifischste Regel kann applizieren (Paninis Prinzip; Spezifitätsprinzip).
 - Regeln in verschiedenen Blöcken konkurrieren nicht; so treten in einer Wortform verschiedene Exponenten hintereinander.

Bemerkung:

Die Exponenten kommen durch Regeln in eine Wortform und haben keinen eigenständigen Status. Die Theorie ist also *amorphematisch* (vgl. Anderson (1992)).

Slogan: *Paradigmenfunktionen sind statische Wohlgeformtheitsbedingungen für Zellen.*

Definitionen

- (115) *Wohlgeformte Menge morphosyntaktischer Eigenschaften*:
Eine Menge τ von morphosyntaktischen Eigenschaften für ein Lexem der Kategorie C ist wohlgeformt in einer Sprache L nur dann, wenn τ die folgenden Bedingungen in L erfüllt.
- Für jede Eigenschaft $F:v \in \tau$ gilt: $F:v$ ist für Lexeme der Kategorie C zugänglich und v ist ein erlaubter Wert für F.
 - Für jedes morphosyntaktische Merkmal F, das v_1, v_2 als mögliche Werte hat, gilt: Wenn $v_1 \neq v_2$ und $F:v_1 \in \tau$, dann $F:v_2 \notin \tau$.
- (116) *Extension*:
Falls σ und τ wohlgeformte Mengen morphosyntaktischer Eigenschaften sind, ist σ eine Extension von τ gdw. (a) und (b) gelten.
- Für jedes atomwertige Merkmal F und jeden erlaubten Wert v für F gilt: Wenn $F:v \in \tau$, dann $F:v \in \sigma$.
 - Für jedes mengenwertige Merkmal F und jeden erlaubten Wert p für F gilt:

Wenn $F:p \in \tau$, dann $F:p' \in \tau$, wobei p' eine Extension von p ist.

- (117) *Unifikation*:
Falls σ und τ wohlgeformte Mengen morphosyntaktischer Merkmale sind, ist die Unifikation ρ von σ und τ die kleinste wohlgeformte Menge von morphosyntaktischen Eigenschaften, so dass ρ eine Extension sowohl von σ , als auch von τ ist.
- (118) a. $\{\text{TNS:pres,AGR:}\{\text{PER:1,NUM:pl}\}\}$ ist Extension von $\{\text{AGR:}\{\text{PER:1,NUM:pl}\}\}$, $\{\text{AGR:}\{\text{NUM:pl}\}\}$, $\{\}$, usw.
b. $\{\text{TNS:pres,MOOD:ind,AGR:}\{\text{PER:1,NUM:pl}\}\}$ ist die Unifikation von $\{\text{TNS:pres,AGR:}\{\text{PER:1}\}\}$ und $\{\text{TNS:pres,MOOD:ind,AGR:}\{\text{NUM:pl}\}\}$

Definitionen 2

- (119) *Eigenschaftskookkurrenzrestriktionen* (bulgarische Verbformen; Ausschnitt):
Eine Menge τ von morphosyntaktischen Eigenschaften für ein Lexem der Kategorie V ist wohlgeformt nur, wenn τ eine wohlgeformte Extension σ hat, so dass gilt:
- σ ist eine Extension von $\{\text{VFORM:fin}\}$ gdw. für ein zulässiges α gilt: σ ist eine Extension von $\{\text{MOOD:}\alpha\}$. (wenn Finitheit, dann Modus (Ind oder Konj))
 - Wenn σ eine Extension ist von $\{\text{MOOD:impv}\}$, dann ist σ eine Extension von $\{\text{AGR:}\{\text{PER:2}\}\}$. (wenn Imperativ, dann 2. Person)
 - Für jedes zulässige α gilt: σ ist eine Extension von $\{\text{TNS:}\alpha\}$ gdw. σ eine Extension ist von $\{\text{MOOD:indic}\}$ oder von $\{\text{VFORM:ppl}\}$. (V hat Tempus wenn es Ind. oder Partizip ist)
 - Für jedes zulässige α gilt: σ ist eine Extension von $\{\text{AGR:}\{\text{GEN:}\alpha\}\}$ gdw. σ eine Extension ist von $\{\text{VFORM:ppl}\}$, und σ ist eine Extension von $\{\text{AGR:}\{\text{PERS:}\alpha\}\}$ gdw. σ eine Extension ist von $\{\text{VFORM:fin}\}$. (Wenn Genus, dann Partizip; wenn Person, dann Finitheit)
- (120) *Vollständigkeit* von Mengen morphosyntaktischer Merkmale:
Eine Menge σ von morphosyntaktischen Merkmalen für ein Lexem einer Kategorie ist vollständig gdw. (a) und (b) gelten:
- σ ist wohlgeformt.
 - Für jede Menge morphosyntaktischer Merkmale τ (so dass σ nicht eine Extension von τ ist) gilt: die Unifikation von τ und σ ist nicht wohlgeformt.

Definitionen 3

Paradigmenfunktionen:

Eine Paradigmenfunktion ist eine Funktion in der Menge der FPSPs, die auf einem *Wurzelpaar* $\langle X, \sigma \rangle$ appliziert (wobei X die Wurzel eines Lexems L ist und σ eine vollständige Menge morphosyntaktischer Eigenschaften für L ist) und eine σ -Zelle $\langle Y, \sigma \rangle$ im Paradigm von L ergibt.

(121) *Format von Paradigmenfunktionen:*

$$PF(\langle X, \sigma \rangle) = \langle Y, \sigma \rangle$$

Realisierungsregeln ('realization rules', 'rules of exponence'):

Eine Realisierungsregel ist eine Funktion in der Menge der FPSPs. Im Unterschied zu einer Paradigmenfunktion muss aber das Argument nicht unbedingt ein Wurzelpaar sein, und der Wert muss nicht unbedingt eine Paradigmenzelle sein.

(122) *Format von Realisierungsregeln:*

$$RR_{n,\tau,C}(\langle X, \sigma \rangle) = \langle Y', \sigma \rangle$$

Terminologie:

- n : Blockindex
- τ : Eigenschaftsmengenindex (die wohlgeformte Menge morphosyntaktischer Eigenschaften, die die Regel durch ihre Anwendung realisiert; σ muss Extension von τ sein \rightarrow *Unterspezifikation*)
- C : Klassenindex (Klasse der Lexeme, deren Paradigmen die Regel mit definieren kann)
- Y' : im Default Y , aber Möglichkeit der Überschreibung durch morphologische Regeln

Bulgarische Verbflexion

(123) *Vier imperfektive Verben im Bulgarischen:*

- KRAD ('stehlen'): 1.St. = *krad*, 2.St. = *krád*
- IGRÁJ ('spielen'): 1.St. = *igráj*, 2.St. = *igrá*
- KOVA ('fälschen'): 1.St. = *kov*, 2.St. = *kova*
- DÁVA ('geben'): 1.St. = *dáva*, 2.St. = *dáva*

Zwei Stämme:

- Stamm: Präsens, Imperfekt
- Stamm: Aorist

Zwei abstrakte binäre Flexionsklassenmerkmale: $[\pm t(\text{runcating})]$, $[\pm c(\text{onsonantal})]$:

$[-t]$: 1./2. Stamm: identisch zur Wurzel

$[+t]$: 1. Stamm: C , 2. Stamm: V

Auf diese Flexionsklassenmerkmale (auch unterspezifiziert) wird in Realisierungsregeln und morphologischen Regeln Bezug genommen.

- (124) a. KRAD: $[-t, +c]$
 b. IGRÁJ ('spielen'): $[+t, +c]$
 c. KOVA ('fälschen'): $[+t, -c]$
 d. DÁVA ('geben'): $[-t, -c]$

Paradigmen der bulgarischen Verbflexion

(125) *Abstrakte Paradigmen des Indikativs ohne morphologische Regeln:*

| Konjugation | | KRAD [-t, +c] | DÁVA [-t, -c] | IGRÁJ [+t, +c] | KOVA [+t, -c] |
|-------------|-----|--------------------|--------------------|---------------------|--------------------|
| Präsens | 1sg | <i>krad-e-ə</i> | <i>dáva-e-m</i> | <i>igráj-e-ə</i> | <i>kov-e-ə</i> |
| | 2sg | <i>krad-e-š</i> | <i>dáva-e-š</i> | <i>igráj-e-š</i> | <i>kov-e-š</i> |
| | 3sg | <i>krad-e-e</i> | <i>dáva-e-e</i> | <i>igráj-e-e</i> | <i>kov-e-e</i> |
| | 1pl | <i>krad-e-m</i> | <i>dáva-e-me</i> | <i>igráj-e-m</i> | <i>kov-e-m</i> |
| | 2pl | <i>krad-e-te</i> | <i>dáva-e-te</i> | <i>igráj-e-te</i> | <i>kov-e-te</i> |
| | 3pl | <i>krad-e-ət</i> | <i>dáva-e-ət</i> | <i>igráj-e-ət</i> | <i>kov-e-ət</i> |
| Imperfekt | 1sg | <i>krad-A-x</i> | <i>dáva-A-x</i> | <i>igráj-A-x</i> | <i>kov-A-x</i> |
| | 2sg | <i>krad-A-x-e</i> | <i>dáva-A-x-e</i> | <i>igráj-A-x-e</i> | <i>kov-A-x-e</i> |
| | 3sg | <i>krad-A-x-e</i> | <i>dáva-A-x-e</i> | <i>igráj-A-x-e</i> | <i>kov-A-x-e</i> |
| | 1pl | <i>krad-A-x-me</i> | <i>dáva-A-x-me</i> | <i>igráj-A-x-me</i> | <i>kov-A-x-me</i> |
| | 2pl | <i>krad-A-x-te</i> | <i>dáva-A-x-te</i> | <i>igráj-A-x-te</i> | <i>kov-A-x-te</i> |
| | 3pl | <i>krad-A-x-a</i> | <i>dáva-A-x-a</i> | <i>igráj-A-x-a</i> | <i>kov-A-x-a</i> |
| Aorist | 1sg | <i>krád-o-x</i> | <i>dáva-o-x</i> | <i>igrá-o-x</i> | <i>kova-o-x</i> |
| | 2sg | <i>krád-e</i> | <i>dáva-e</i> | <i>igrá-e</i> | <i>kova-e</i> |
| | 3sg | <i>krád-e</i> | <i>dáva-e</i> | <i>igrá-e</i> | <i>kova-e</i> |
| | 1pl | <i>krád-o-x-me</i> | <i>dáva-o-x-me</i> | <i>igrá-o-x-me</i> | <i>kova-o-x-me</i> |
| | 2pl | <i>krád-o-x-te</i> | <i>dáva-o-x-te</i> | <i>igrá-o-x-te</i> | <i>kova-o-x-te</i> |
| | 3pl | <i>krád-o-x-a</i> | <i>dáva-o-x-a</i> | <i>igrá-o-x-a</i> | <i>kova-o-x-a</i> |

Realisierungsregeln

(126) a. *Block A:*

A1 $RR_{A,\{TNS:aor\},V}(\langle X, \sigma \rangle) =_{def} \langle Y', \sigma \rangle$, wobei Y der 2. Stamm von X ist.

A2 $RR_{A,\{ \},V}(\langle X, \sigma \rangle) =_{def} \langle Y', \sigma \rangle$, wobei Y der 1. Stamm von X ist.

b. *Block B & Block C:*

B1 $RR_{B,\{TNS:pres\},V}(\langle X, \sigma \rangle) =_{def} \langle Xe', \sigma \rangle$

B2 $RR_{B,\{TNS:impf\},V}(\langle X, \sigma \rangle) =_{def} \langle XA', \sigma \rangle$

B3 $RR_{B,\{TNS:aor,PRET:yes\},V}(\langle X, \sigma \rangle) =_{def} \langle Xd', \sigma \rangle$

B4/C1 Wenn $n = \mathbf{B}$ oder \mathbf{C} :

$RR_{n,\{TNS:aor,PRET:yes,AGR:\{PER:3,NUM:sg\}\},V}(\langle X, \sigma \rangle) =_{def} \langle X', \sigma \rangle$

C2 $RR_{C,\{PRET:yes\},V}(\langle X, \sigma \rangle) =_{def} \langle Xx', \sigma \rangle$

c. *Block D:*

D1 $RR_{D,\{TNS:pres,AGR:\{PER:1,NUM:sg\}\},V}(\langle X, \sigma \rangle) =_{def} \langle Xd', \sigma \rangle$

D2 $RR_{D,\{TNS:pres,AGR:\{PER:1,NUM:sg\}\},\{CONJ:-T,-C\}}(\langle X, \sigma \rangle) =_{def} \langle Xm', \sigma \rangle$

D3 $RR_{D,\{TNS:pres,AGR:\{PER:2,NUM:sg\}\},V}(\langle X, \sigma \rangle) =_{def} \langle Xs', \sigma \rangle$

D4 $RR_{D,\{AGR:\{PER:3,NUM:sg\}\}}(\langle X, \sigma \rangle) =_{def} \langle Xe', \sigma \rangle$

D5 $RR_{D,\{TNS:pres,AGR:\{PER:1,NUM:pl\}\},\{CONJ:+T\} \cup \{CONJ:+C\}}(\langle X, \sigma \rangle) =_{def} \langle Xm', \sigma \rangle$

D6 $RR_{D,\{AGR:\{PER:1,NUM:pl\}\},V}(\langle X, \sigma \rangle) =_{def} \langle Xme', \sigma \rangle$

- D7** $RR_{D,\{AGR:\{PER:2,NUM:pl\}\},V}(\langle X,\sigma \rangle) =_{def} \langle Xte',\sigma \rangle$
D8 $RR_{D,\{TNS:pres,AGR:\{PER:3,NUM:pl\}\},V}(\langle X,\sigma \rangle) =_{def} \langle X\theta',\sigma \rangle$
D9 $RR_{D,\{AGR:\{PER:3,NUM:pl\}\},V}(\langle X,\sigma \rangle) =_{def} \langle Xd',\sigma \rangle$

- (127) *Verweisregel* ('rule of referral'; informelle Variante):
 Im Präteritum (Aorist und Imperfekt) richtet sich die 2.Pers.Sg. nach der 3.Pers.Sg.

Regelanwendung 1: Spezifität

- (128) *Paninis Prinzip*:
 Es sei σ eine vollständige Menge von morphosyntaktischen Eigenschaften für Lexeme der Kategorie V. Dann ist $PF(\langle X,\sigma \rangle) =_{def} Nar_D(Nar_C(Nar_B(Nar_A(\langle X,\sigma \rangle))))$
- (129) *Nar_n-Notation*:
 Falls $RR_{n,\tau,C}$ die **engste** Regel in Block n ist, die auf $\langle X,\sigma \rangle$ **anwendbar** ist, so repräsentiert 'Nar_n($\langle X,\sigma \rangle$)' das Resultat der Anwendung von $RR_{n,\tau,C}$ auf $\langle X,\sigma \rangle$.
- (130) *Enge und Anwendbarkeit* (vereinfacht):
 a. $RR_{n,\sigma,C}$ ist enger als $RR_{n,\tau,C}$ gdw. σ eine Extension von τ ist und $\sigma \neq \tau$.
 b. $RR_{n,\tau,C}$ ist anwendbar auf $\langle X,\sigma \rangle$ gdw. $RR_{n\tau,C}(\langle X,\sigma \rangle)$ definiert ist.

- (131) *Regel-Argument-Kohärenz*:
 $RR_{n\tau,C}(\langle X,\sigma \rangle)$ ist definiert gdw. (a) σ eine Extension von τ ist (s.o.); (b) $L-Index(X) \in C$ ist; und (c) σ eine wohlgeformte Menge von morphosyntaktischen Eigenschaften für $L-Index(X)$ ist.

Regelanwendung 2: Identitätsfunktion

- (132) *Default der Identitätsfunktion*:
 $RR_{n,\{ \},U}(\langle X,\sigma \rangle) =_{def} \langle X,\sigma \rangle$

Bemerkung:

Dies ist so etwas wie ein Nullmarker, der als minimal spezifische Regel in jedem Block (n ist eine Variable über allen Regelblöcken, U über allen Lexemklassen) zur Verfügung steht und dafür sorgt, dass es immer weiter geht. Beispiel:

- (133) Beispiel:
 a. $\sigma = \{VFORM:fin, VCE:act, TNS:pres, PRET:no, MOOD:indic, AGR:\{PER:1,NUM:pl\}\}$
 b. $Nar_C(\langle kradé,\sigma \rangle) = RR_{C,\{ \},U}(\langle kradé,\sigma \rangle) = \langle kradé,\sigma \rangle$

Regelanwendung 3: Verweisregeln und Synkretismus

Manche Synkretismen kann man im Prinzip durch *Unterspezifikation*, auch bzgl. *abstrakter morphosyntaktischer Merkmale* ableiten ([pret:yes/no] ist ein solches); oder durch vollständige Unterspezifikation bzgl. einer grammatischen Kategorisierung (vgl. den Synkretismus bei der 3.Pers.Pl. im Aorist und Imperfekt: D9 vs. D8). Es gibt aber

auch andere Synkretismen, wo Stump nicht diesen Weg geht: Bisher hatten wir die folgende informelle Version einer Verweisregel, die einen systematischen Synkretismus bei der 2.Pers.Sg. und der 3.Pers.Sg. ableitet.

- (134) *Verweisregel* (informelle Variante):
 Im Präteritum (Aorist und Imperfekt) richtet sich die 2.Pers.Sg. nach der 3.Pers.Sg.

Jetzt kann die Regel präziser formuliert werden:

- (135) *Verweisregel* (saubere Variante):
 Angenommen, (a)–(c) sind der Fall:
 a. τ ist eine beliebige vollständige Extension von $\{PRET:yes, AGR:\{PERS:2,NUM:sg\}\}$.
 b. n ist ein beliebiger Regelblock in A-D.
 c. $\sigma' = \sigma / \{AGR:\{PER:3\}\}$. (lies: σ modifiziert durch $\{AGR:\{PER:3\}\}$)
 Dann gilt:
 $RR_{n,\tau,V}(\langle X,\sigma \rangle) =_{def} \langle Y,\sigma \rangle$, wobei $Nar_n(\langle X,\sigma' \rangle) = \langle Y,\sigma' \rangle$

Konkrete Paradigmen des Indikativs inkl. Morphologie

| Konjugation | KRAD [-t,+c] | DÁVA [-t,-c] | IGRÁJ [+t,+c] | KOVA [+t,-c] |
|------------------------|-------------------------|-------------------|--------------------|--------------------|
| Präsens | 1sg <i>krad-ó</i> | <i>dáva-m</i> | <i>igráj-ø</i> | <i>kov-ó</i> |
| | 2sg <i>krad-é-š</i> | <i>dáva-š</i> | <i>igrá-e-š</i> | <i>kov-é-š</i> |
| | 3sg <i>krad-é</i> | <i>dáva</i> | <i>igrá-e</i> | <i>kov-é</i> |
| | 1pl <i>krad-é-m</i> | <i>dáva-me</i> | <i>igrá-e-m</i> | <i>kov-é-m</i> |
| | 2pl <i>krad-é-te</i> | <i>dáva-te</i> | <i>igrá-e-te</i> | <i>kov-é-te</i> |
| 3pl <i>krad-ót</i> | <i>dáva-t</i> | <i>igráj-øt</i> | <i>kov-ót</i> | |
| Imperfekt | 1sg <i>krad-'á-x</i> | <i>dáva-x</i> | <i>igrá-ex</i> | <i>kov-'á-x</i> |
| | 2sg <i>krad-é-š-e</i> | <i>dáva-š-e</i> | <i>igrá-e-š-e</i> | <i>kov-é-š-e</i> |
| | 3sg <i>krad-é-š-e</i> | <i>dáva-š-e</i> | <i>igrá-e-š-e</i> | <i>kov-é-š-e</i> |
| | 1pl <i>krad-'á-x-me</i> | <i>dáva-x-me</i> | <i>igrá-e-x-me</i> | <i>kov-'á-x-me</i> |
| | 2pl <i>krad-'á-x-te</i> | <i>dáva-x-te</i> | <i>igrá-e-x-te</i> | <i>kov-'á-x-te</i> |
| 3pl <i>krad-'á-x-a</i> | <i>dáva-x-a</i> | <i>igrá-e-x-a</i> | <i>kov-'á-x-a</i> | |
| Aorist | 1sg <i>krád-o-x</i> | <i>dáva-x</i> | <i>igrá-x</i> | <i>ková-x</i> |
| | 2sg <i>krád-e</i> | <i>dáva</i> | <i>igrá</i> | <i>ková</i> |
| | 3sg <i>krád-e</i> | <i>dáva</i> | <i>igrá</i> | <i>ková</i> |
| | 1pl <i>krád-o-x-me</i> | <i>dáva-x-me</i> | <i>igrá-x-me</i> | <i>ková-x-me</i> |
| | 2pl <i>krád-o-x-te</i> | <i>dáva-x-te</i> | <i>igrá-x-te</i> | <i>ková-x-te</i> |
| 3pl <i>krád-o-x-a</i> | <i>dáva-x-a</i> | <i>igrá-x-a</i> | <i>ková-x-a</i> | |

Annahme:

Für jede Realisierungsregel gibt es eine ungeordnete Menge Φ_R von morphologischen Regeln, die bei jeder Anwendung die Evaluation der Realisierungsregel beschränken.
Morphologische Regeln und Metageneralisierungen

- (136) *Regeln* (Φ_R): Falls $RR_{n,\tau,C}(\langle X,\sigma \rangle) =_{def} \langle Y',\sigma \rangle$, so gilt:
- Wenn der L-Index(X) \in [CONJ:-T,-C] und $Y = X[\text{Vokal}]Z$, dann fehlt [Vokal] in Y' .
 - Wenn $X = W[\text{Vokal}_1]$ und $Y = X[\text{Vokal}_2]Z$, dann fehlt [Vokal₁] in Y' , und [Vokal₂] wird betont in Y' gdw. [Vokal₁] in Y betont wird.
 - Wenn $X = W[\text{Vokal}_1]$ und $Y = X[\text{Vokal}_2]Z$, dann fehlt [Vokal₂] in Y' .
 - Wenn Y unbetont ist, dann wird Y' auf seiner letzten Silbe betont.
 - Wenn $X = WC$ (C ein Velar mit \check{C} als alveopalatalem Gegenstück), $Y = XVZ$, und V ein vorderer Vokal, dann hat Y' \check{C} anstelle von C .
 - Wenn $Y = W\acute{A}Z$, dann hat Y' ein e anstelle von \acute{A} .
 - Wenn $Y = W\acute{A}C_1VZ$ und V ist ein vorderer Vokal, dann hat Y' ein \acute{e} anstelle von \acute{A} .
 - Wenn $Y = W\acute{A}Z$, dann hat Y' \acute{a} (mit Palatalisierung eines unmittelbar vorangehenden Konsonanten) anstelle von \acute{A} .
- (137) *Metageneralisierungen*:
- Für jede Regel R in Block **B**, **C** oder **D** gilt: (136-ae) $\in \Phi_R$.
 - Für jede Regel R in Block **B**, **C** oder **D** gilt: (136-b) $\in \Phi_R$ gdw. R eine Extension von {TNS:pres} realisiert; ansonsten: (136-c) $\in \Phi_R$.
 - Falls R in Block **B** ist, gilt: (136-d) $\in \Phi_R$.
 - Falls R in Block **D** ist, gilt: (136-fh) $\in \Phi_R$.
 - (136-g) $\in \Phi_{D4}, \Phi_{B1}$.

1.4.3 Wettbewerb

Argumentkodierung im Georgischen

Stand der Dinge bisher:

Der Wettbewerb zwischen Realisierungsregeln in einem Block wird durch die spezifischste (engste) Regel gewonnen (das Paninische Prinzip). Es stellt sich aber heraus, dass es hiermit Probleme geben kann, so dass noch mehr gesagt werden muss.

Beispiel:

Realisationsregeln für argumentkodierende Präfixe im Georgischen in (138) (Stump (2001, 70)). (Das System der Argumentkodierung im Georgischen ist notorisch komplex; hier wird nur ein ganz kleiner Ausschnitt abgehandelt.)

- (138) a. $RR_{\text{pref},\{AGR(su):\{PER:1\}\},V}(\langle X,\sigma \rangle) =_{def} \langle vX',\sigma \rangle$
 b. $RR_{\text{pref},\{AGR(ob):\{PER:1\}\},V}(\langle X,\sigma \rangle) =_{def} \langle mX',\sigma \rangle$
 c. $RR_{\text{pref},\{AGR(ob):\{PER:1,NUM:pl\}\},V}(\langle X,\sigma \rangle) =_{def} \langle gvX',\sigma \rangle$
 d. $RR_{\text{pref},\{AGR(ob):\{PER:2\}\},V}(\langle X,\sigma \rangle) =_{def} \langle gX',\sigma \rangle$

Problem:

Was ist die korrekte V-Realisierung für "Ich werde dich töten"? Die morphosyntaktischen Merkmalsmengen von (138-a) und (138-d) stehen nicht zueinander in einem Extensionsverhältnis; also sollten beide passen. Empirisch ist aber korrekt, dass (138-d)

angewendet wird und so (138-a) blockiert.

| | Präverb | Präfix | Stamm | Suffix | |
|-------|---------|--------|-------|--------|------------------------|
| (139) | mo- | g- | klav | | 'Ich werde dich töten' |
| | *mo- | v- | klav | | 'Ich werde dich töten' |
| | mo- | g- | klav | -t | 'Ich werde euch töten' |

Lösungen für das Dilemma

- (140) *Extrinsische Regelordnung* (Anderson (1992)):
 Regel (138-d) appliziert per Stipulation vor Regel (138-a).
- (141) *Expandierter Modus* (Stump (2001)):
 Regeln können aufgeblasen werden und sind dann maximal spezifisch.
- (142) *Regelformate*:
- Unexpandierter Modus:
 $RR_{n,\tau,C}(\langle X,\sigma \rangle) =_{def} \langle Y',\sigma \rangle$
 - Expandierter Modus:
 $RR_{n,\leftarrow\tau\rightarrow,C}(\langle X,\sigma \rangle) =_{def} \langle Y',\sigma \rangle$

" $\leftarrow\tau\rightarrow$ " bedeutet vereinfacht, dass τ maximal erweitert wird.

Konklusion: Regel (138-d) im Georgischen arbeitet im expandierten Modus:

- (143) $RR_{\text{pref},\leftarrow\{AGR(ob):\{PER:2\}\}\rightarrow,V}(\langle X,\sigma \rangle) =_{def} \langle gX',\sigma \rangle$

1.4.4 Synkretismus

Typen von Synkretismus

Erste Unterscheidung:

Ganzwortsynkretismen vs. *Blocksynkretismen*. Beide sollen erklärt werden (vgl. dazu aber Baerman et al. (2005)).

Zweite Unterscheidung:

- unidirektionaler Synkretismus Verweisregel
- bidirektionaler Synkretismus Bidirektionales Verweisprinzip
- unstipulierter Synkretismus Unterspezifikation
- stipulierter (z.B. symmetrischer) Synkretismus Metaregeln für symmetrischen Synkretismus

Unidirektionaler Synkretismus Der Synkretismus in der 2./3.Pers.Sg. Prät (Aorist und Imperfekt) im Bulgarischen ist unidirektional:

- In allen Tempora können Formen der 3.Pers.Sg. eine Endung *-e* haben.

- Nur in den Präteritaltempora haben Formen der 2.Pers.Sg. eine Endung *-e*.

(144) *Verweisregel* (mit expandiertem Modus):

Wenn n ein beliebiger Regelblock in A-D ist, dann gilt:

$$\begin{aligned} \text{RR}_{n, \leftarrow \{ \text{pret:yes, agr:} \{ \text{per:2, num:sg} \} \} \rightarrow, V}(\langle X, \sigma \rangle) &=_{\text{def}} \langle Y, \sigma \rangle, & \text{wobei} \\ \text{Nar}_n(\langle X, \sigma / \{ \text{AGR:} \{ \text{PER:3} \} \} \rangle) &= \langle Y, \sigma / \{ \text{AGR:} \{ \text{PER:3} \} \} \rangle \end{aligned}$$

Bidirektionaler Synkretismus 1

Rumänische Verbflexion:

- Alle außer 1. Konjugation: 1.Sg. = 3.Pl. in indikativischen Paradigmen.
- Manchmal ist die 3.Pl. der abhängige Teil: *a umplea*, *a ști*. (Die *u*-Form taucht nur in der 1.Sg. in der 1. Konjugation auf.)
- Manchmal ist die 1.Sg. der abhängige Teil: *a fi*. (Der Stamm *sînt* taucht auch sonst im Plural auf.)

(145) Präsens-Indikativ-Formen einiger rumänischer Verben:

| | <i>a invita</i> | <i>a umplea</i> | <i>a ști</i> | <i>a fi</i> |
|----------------|-----------------|-----------------|--------------|-------------|
| | einladen | füllen | wissen | sein |
| Konjugation: 1 | 2 | 4 | 4 | |
| 1sg | invít | úmpl-u | ști-u | sînt |
| 2sg | invít-i | úmpl-i | ști-i | èțt-i |
| 3sg | invít-a | úmpl-e | ști-e | éțt-e |
| 1pl | invítá-m | úmpl-e-m | ști-m | sînte-m |
| 2pl | invítá-ți | úmpl-ți | ști-ți | sînte-ți |
| 3pl | invít-a | úmpl-u | ști-u | sînt |

Bidirektionaler Synkretismus 2

Annahmen:

- Jede Verweisregel $\text{RR}_{n, \tau, C}$ hat eine *Verweisdomäne* D , mit C als Teilmenge von D .
- Die Existenz einer Verweisregel impliziert die Existenz einer inversen Verweisregel, gemäß (146).

(146) *Bidirektionales Verweisprinzip*:

Die Existenz einer Verweisregel ' $\text{RR}_{n, \tau, C}(\langle X, \sigma \rangle) =_{\text{def}} \langle Y, \sigma \rangle$, wobei $\text{Nar}_n(\langle X, \sigma / \rho \rangle) = \langle Y, \sigma / \rho \rangle$ ' mit Verweisdomäne D impliziert die Existenz einer zweiten Verweisregel ' $\text{RR}_{n, \tau / \rho, D-C}(\langle X, \sigma \rangle) =_{\text{def}} \langle Y, \sigma \rangle$, wobei $\text{Nar}_n(\langle X, \sigma / \tau \rangle) = \langle Y, \sigma / \tau \rangle$ ' mit Verweisdomäne D .

(Wenn eine Regel C als Verweisdomäne hat – der Normalfall –, dann ist die inverse Regel uninteressant, weil sie sich auf eine leere Menge von Ausdrücken beziehen muss.)

Bidirektionaler Synkretismus 3

(147) Erste Verweisregel:

Falls $n = 0$ oder 1 : $\text{RR}_{n, \{ \text{agr}(su): \{ \text{per:1, num:sg} \} \}, a \text{ fi}}(\langle X, \sigma \rangle) =_{\text{def}} \langle Y, \sigma \rangle$, wobei $\text{Nar}_n(\langle X, \sigma / \{ \text{AGR}(su): \{ \text{PER:3, NUM:pl} \} \} \rangle) = \langle Y, \sigma / \{ \text{agr}(su): \{ \text{per:3, num:pl} \} \} \rangle$
Verweisdomäne: V

(148) Implizierte Verweisregel:

Falls $n = 0$ oder 1 : $\text{RR}_{n, \{ \text{agr}(su): \{ \text{per:3, num:pl} \} \}, V-a \text{ fi}}(\langle X, \sigma \rangle) =_{\text{def}} \langle Y, \sigma \rangle$, wobei $\text{Nar}_n(\langle X, \sigma / \{ \text{AGR}(su): \{ \text{PER:1, NUM:sg} \} \} \rangle) = \langle Y, \sigma / \{ \text{AGR}(su): \{ \text{PER:1, NUM:sg} \} \} \rangle$
Verweisdomäne: V

Symmetrischer Synkretismus

Verbflexion im Hua (auch: Yagaria; Neu Guinea):

Formen der 2.Sg. und der 1.Pl. haben immer dieselbe Endung (ein Blocksynkretismus, kein Ganzwortsynkretismus), in allen Tempora und Modi. Man sieht aber nicht, wie es sich hier um eine natürliche Klasse handeln könnte; und der Synkretismus ist auch nicht direktional.

(149) *Metaregel für symmetrischen Synkretismus*:

$$\text{RR}_{n, \tau, C}(\langle X, \sigma \rangle) =_{\text{def}} \langle Y, \sigma \rangle \leftrightarrow \text{RR}_{n, \tau / \rho, C}(\langle X, \sigma \rangle) =_{\text{def}} \langle Y, \sigma \rangle$$

(150) *Metaregel für Hua*:

Es sei τ eine Extension von $\{ \text{AGR}(su): \{ \text{PER:2, NUM:sg} \} \}$. Dann: $\text{RR}_{II, \tau, V}(\langle X, \sigma \rangle) =_{\text{def}} \langle Y, \sigma \rangle \leftrightarrow \text{RR}_{II, \tau / \{ \text{agr}(su): \{ \text{per:1, num:pl} \} \}, V}(\langle X, \sigma \rangle) =_{\text{def}} \langle Y, \sigma \rangle$

Alternative (Chomsky (1965), Chomsky & Halle (1968a)): α -Notation: Variable über Merkmalswerten.

- (151) a. $[+1, -2], [+pl]$
 b. $[-1, +2], [-pl]$
 c. α -Notation: $[\alpha 1, -\alpha 2], [\alpha pl]$

1.5 Minimalist Morphology

1.5.1 Basic Assumptions

Refs.: Wunderlich (1996, 1997b)

- pre-syntactic approach
- lexical-incremental approach
- no abstract morphemes
- no zero affixes
- maximal underspecification

- no inflection class features
- three information sources:
 - lexical entry of the stem (plus stem alternations)
 - lexical entry of the affix
 - organization of paradigm structures
- paradigms as filtering devices blocking overgeneration: compatibility and specificity

(152) *Principles of affixation:*

- a. Monotonicity: The output of affixation must be more informative than the input.
- b. Adjacency: The input requirements of affixes must be met locally.
- c. Affix order: The order of affixes must conform to the hierarchy of functional categories, i.e., affixes that express lower ranked categories must be attached first.

(153) *Paradigm principles:*

- a. Completeness: Every cell of a paradigm must be occupied.
- b. Uniqueness: Every cell of a paradigm is uniquely occupied.

Observation:

Most candidate word forms have fewer specifications than the form that defines the paradigm.

(154) *Selection Principles:*

- a. Output Specificity: Word forms with more feature specifications take precedence over those with fewer feature specifications.
- b. Input Specificity: Word forms with underlying (lexically specified) feature values take precedence over those with derived values.
- c. Simplicity: Strings made of fewer affixes take precedence over those made up of more affixes.
(Note: Simplicity is ranked below Output Specificity.)

Basic assumption:

Word forms that are maximally specific define the dimensions of a paradigm!

Consequence:

In contrast to what is the case in DM and PFM, specificity does not select the most specific (underspecified) form for a *fully specified* (= syntactic) context; rather, it selects the most specific (underspecified) form for a paradigm, which need not be fully specified.

(155) *Affixes* (verb inflection in German):

- a. /t/ → [+2,+pl]

- b. /st/ → [+2]
- c. /n/ → [+pl]
- d. /te/ → [+pret]
- e. /e/ → [+1]/_[-pret]
- f. /t/ → []/_[-pret]

(156) *Simple application* (weak verbs, present tense):

| | | |
|------|-------|--------|
| | [+pl] | [-pl] |
| [+2] | bau-t | bau-st |
| [-2] | bau-n | bau-e |

Note:

Given that affixation by (the most specific marker) /t/ instantiates the dimensions of the present tense (indicative) paradigm, it seems that an additional assumption might be necessary to integrate 3.SG. forms into the paradigm: [±1] is not a dimension introduced by the most specific marker. Then again, /t/ may define a subparadigm of its own.

(157) *Candidate word forms* (strong verb inflection in German):

| | | |
|--------------|-------------------|-----------------|
| warf-t | [+2,+pl,+pret,+V] | |
| warf-n-t | [+2,+pl,+pret,+V] | *Simp |
| warf-n-st | [+2,+pl,+pret,+V] | *Simp |
| werf-te-t | [+2,+pl,+pret,+V] | *In-Spec, *Simp |
| werf-te-n-t | [+2,+pl,+pret,+V] | *In-Spec, *Simp |
| werf-te-n-st | [+2,+pl,+pret,+V] | *In-Spec, *Simp |
| warf-st | [+2,+pret,+V] | |
| werf-te-st | [+2,+pret,+V] | *In-Spec, *Simp |
| warf-n | [+pl,+pret,+V] | |
| werf-te-n | [+pl,+pret,+V] | *In-Spec, *Simp |
| warf | [+pret,+V] | |
| werf-te | [+pret,+V] | *In-Spec, *Simp |

1.5.2 Feature Deletion by Constraint Interaction

Background:

MM has a technical means that is comparable in its effects to impoverishment (DM) and rules of referral (PFM): The interaction of violable constraints in an optimality-theoretic system may lead to unfaithful output realization of features that are part of the input (MAX, DEP violations).

Empirical domain:

Genitive/accusative syncretism with animate nouns tems in Russian

Refs.: Wunderlich (2004)

(158) *Russian nouns with animacy split in forms that are used in accusative contexts*

| | inanimates | | | | animates | | |
|-------|---------------|----------------|------------------|-----------------|--------------------|------------------|--------------------|
| | class 2 | class 3 | class 1 | class 4 | class 2 | class 3 | class 1 |
| | fem. 'map' | fem. 'door' | masc. 'table' | neut. 'word' | fem. 'squirrel' | fem. 'mother' | masc. 'student' |
| N.sg. | kárt-a | dver' | stol | slov-o | bélk-a | mat' | studént |
| A.sg. | kárt-u | dver' | stol | slov-o | bélk-u | mat' | studént-a |
| G.sg. | kárt-y | dvér-i | stol-á | slov-á | bélk-i | máter-i | studént-a |
| N.pl. | kárt-y | dvér-i | stol-ý | slov-á | bélk-i | máter-i | studént-y |
| A.pl. | kárt-y | dvér-i | stol-ý | slov-á | bélok | máter-ej | studént-ov |
| G.pl. | kart | dver-ěj | stol-óv | slov | bélok | máter-ej | studént-ov |

(159) *Case features:*

- Nom = ()
- Acc = (+hr)_V
- Gen = (+hr)_N

(160) *Suffixes*

- /-y/, +pl N.pl (class 1,2 & 3)
- /-a/, +pl/neuter N.pl (class 4)
- /-u/, (+hr)_V / a] A.sg (class 2)
- /-y/, (+hr)_N / a] ∨ PAL] G.sg (class 2 & 3)
- /-a/, +hr / C] ∨ o] A/G.sg (class 1 & 4)
- C], +pl,+hr / a] ∨ o] A/G.pl (class 2 & 4)
- /-ej/, +pl,+hr / PAL] A/G.pl (class 3)
- /-ov/, +pl,+hr A/G.pl (class 1)

(161) *Lexical entries for some Russian case affixes*

| | inanimates | | | animates | | |
|-------|--------------------------|------------------|------------------|--------------------------|------------------|------------------|
| | class 2 | class 3 | class 1 | class 2 | class 3 | class 1 |
| | 'map' | 'door' | 'table' | 'squirrel' | 'mother' | 'student' |
| N.sg. | a] | PAL] | | a] | PAL] | |
| A.sg. | /-u/, (+hr) _V | | | /-u/, (+hr) _V | | |
| G.sg. | /-y/, (+hr) _N | | /-a/, +hr | /-y/, (+hr) _N | | /-a/, +hr |
| N.pl. | /-y/, +pl | | | /-y/, +pl | | |
| A.pl. | | | | | | |
| G.pl. | C], +pl,+hr | /ej/, +pl,+hr | /ov/, +pl,+hr | C], +pl,+hr | /ej/, +pl,+hr | /ov/, +pl,+hr |

Observation:

The interaction of the suffixes alone does not yet make the correct predictions in all cases.

Assumption:

In addition, the distribution of suffixes is regulated by a system of violable constraints

in an optimality-theoretic approach.

(162) *Constraints*

- *(+hr)/_V inanim. Do not realize the feature [+hr] in accusative contexts of inanimate nouns.
- MAX(+hr). Realize the feature [+hr].
- Ranking of the constraints:
*(+hr)/_V inanim \gg MAX(+hr) \gg *(+hr)/_V anim

(163) *More constraints*

- MAX(+hr)/ -pl, a]
- SPECIFICITY
Choose the affix with the more specific selectional information.
- COMPATIBILITY
Do not insert a form in a context in which the categorial specifications are incompatible.

(164) *Ranking of the constraints*

SPEC, COMP, MAX(+hr)/-pl, a] \gg *(+hr)/_V -anim \gg MAX(+hr)

Put into words: "Realize both accusative and genitive, unless inanimate nouns occur in accusative contexts, excluding class 2 nouns (ending in -a, where there exists the accusative morpheme /-u/)."

(165) *Selection of optimal forms in an accusative singular context*

- Inanimate class 2 nouns (a])

| | SPEC | COMP | MAX(+hr)/ -pl, a] | *(+hr)/ _V -anim | MAX(+hr) |
|----------|------|------|----------------------|-------------------------------|----------|
| karta | | | *! | | * |
| kart-y | | *! | | | |
| ☞ kart-u | | | | | |

- Inanimate class 1 nouns (masc)

| | SPEC | COMP | MAX(+hr)/ -pl, a] | *(+hr)/ _V -anim | MAX(+hr) |
|--------|------|------|----------------------|-------------------------------|----------|
| ☞ stol | | | | | * |
| stol-a | | | | *! | |
| stol-y | | *! | | | |

- Animate class 1 nouns (masc)

| | SPEC | COMP | MAX(+hr)/ -pl, a] | *(+hr)/ _V -anim | MAX(+hr) |
|-------------|------|------|----------------------|-------------------------------|----------|
| student | | | | | *! |
| ☞ student-a | | | | | |
| student-y | | *! | | | |

- Animate class 3 nouns (PAL])

| | SPEC | COMP | MAX(+hr)/ -pl, a] | *(+hr)/ _V -anim | MAX(+hr) |
|----------|------|------|----------------------|-------------------------------|----------|
| ☞ mat' | | | | | * |
| mater'-i | | *! | | | |

(166) *A/N and A/G syncretisms in Russian nouns*

| A/N syncretism | | A/G syncretism | |
|---|--|--|---|
| appears because | is blocked because | appears because | is blocked because |
| no affix is available (class 3) | an affix is available (class 2) | only underspecified affixes are available (class 1 and plural) | two specific affixes are available (class 2) |
| a higher-ranked constraint blocks the existing affix (class 1, class 4) | an even higher-ranked constraint forces the existing affix to appear (class 2) | | only one specific genitive affix is available (class 3) |

Note:

This analysis can be extended to the plural.

(167) *Selection of optimal forms in an accusative plural context*

a. Inanimate class 2 nouns (a])

| | SPEC | COMP | MAX(+hr)/ -pl, a] | *(+hr)/ _V -anim | MAX(+hr) |
|----------|------|------|----------------------|-------------------------------|----------|
| ☞ kart-y | | | | | * |
| kart-ov | *! | | | * | |
| kart | | | | *! | |

b. Animate class 2 nouns (a])

| | SPEC | COMP | MAX(+hr)/ -pl, a] | *(+hr)/ _V -anim | MAX(+hr) |
|---------|------|------|----------------------|-------------------------------|----------|
| belk-i | | | | | *! |
| belk-ov | *! | | | | |
| ☞ belok | | | | | |

Chapter 2

Class Features

2.1 Introduction

*Question:*¹:

What is the status of class features in languages with fusional noun inflection (Russian, Greek, German)?

Claims:

(i) Class features are present in morphology:

They are needed to predict marker choice for a given stem in morphology (gender, phonological, semantic features of the stem do not suffice).

(ii) Class features are binary (e.g., [$\pm\alpha$], [$\pm\beta$]), not privative (e.g., I, II):

They combine to yield the classical inflection classes (natural classes of inflection classes can be formed that permit a systematic account of syncretism across inflection classes).

(iii) Class features are uninterpretable in syntax:

They do not project, and syntactic operations do not refer to them.

(iv) Class features are absent in syntax:

Their presence in syntax would violate the Legibility Condition.

(v) Class features act as probes on noun stems that trigger a morphological Agree operation with an inflection marker that acts as a goal before syntax is reached (in the same way that, e.g., LF-uninterpretable Φ -features on T trigger movement in syntax before LF is reached).

(vi) A pre-syntactic approach to class-driven inflectional morphology respects both the Legibility Condition and the Inclusiveness Condition; inner- or post-syntactic approaches violate at least one of these conditions.

2.2 Class Features in Morphology

Observation:

The noun inflection systems of Russian, Greek, and German exhibit massive syncretism (i.e., identity of two forms with a different morpho-syntactic function), both within an inflection class (*intra-paradigmatic syncretism*), and across inflection classes

¹This chapter is joint work with Artemis Alexiadou.

(*trans-paradigmatic syncretism*).

Paradigms:

Paradigms are epiphenomena; they do not exist as genuine entities that, e.g., constraints may refer to (see Harley & Noyer (1999), Bobaljik (2002b), among many others).

(1) *Syncretism Principle* (meta-grammatical):

Identity of form implies identity of function (within a certain domain, and unless there is evidence to the contrary).

(Null hypothesis for child and linguist.)

Assumption:

There is less evidence against systematic syncretism than is sometimes made out (Carstairs (1987), Zwicky (1991), Williams (1994)). However, we will not try to derive syncretism across numbers.

Caveat:

Throughout, we focus on the core systems of noun inflection in Russian, Greek, and German. We disregard minor inflection classes, stem alternations, stress patterns, lexical idiosyncrasies, etc. These issues are ultimately important in comprehensive morphological accounts; but they arguably do not significantly contribute to the issue of class features.

2.2.1 Noun Inflection in Russian

References:

Jakobson (1962a), Jakobson (1962b), Neidle (1988), Corbett & Fraser (1993), Fraser & Corbett (1994), Halle (1994), Franks (1995), Stump (2001).

2.2.1.1 Data

T_1 : *Inflection class I, Sg.: masc*

| | <i>zavod_m</i> ('factory') | <i>student_m</i> ('student') | <i>tovarišč_m</i> ('comrade') |
|------|--------------------------------------|--|---|
| nom | ∅ | ∅ | ∅ |
| acc | ∅ | a | a |
| dat | u | u | u |
| gen | a | a | a |
| inst | om | om | em |
| loc | e | e | e |

Observation:

(i) Gender features on the stem do not suffice to predict inflection class ($N_{[masc]}$ can be I or II; $N_{[fem]}$ can be II or III).

T_2 : *Inflection class II, Sg.: masc, fem*

| | <i>komnat_f</i> ('room') | <i>učitel'nic_f</i> ('female teacher') | <i>nedel'_f</i> ('week') | <i>muščin_m</i> ('man') |
|------|------------------------------------|--|------------------------------------|-----------------------------------|
| nom | a | a | ja | a |
| acc | u | u | ju | u |
| dat | e | e | e | e |
| gen | y | y | i | y |
| inst | oj(u) | ej(u) | ej(u) | oj(u) |
| loc | e | e | e | e |

T_3 : *Inflection class III, Sg.: fem*

| | <i>tetrad'_f</i> ('notebook') | <i>myš'_f</i> ('mouse') | <i>doč'_f</i> ('daughter') |
|------|---|-----------------------------------|--------------------------------------|
| nom | ∅ | ∅ | ∅ |
| acc | ∅ | ∅ | ∅ |
| dat | i | i | (er)i |
| gen | i | i | (er)i |
| inst | ju | ju | (er)ju |
| loc | i | i | (er)i |

T_4 : *Inflection class IV, Sg.: neut*

| | <i>me st_n</i> ('place') | <i>jablok_n</i> ('apple') | <i>syščestv_n</i> ('being') |
|------|------------------------------------|-------------------------------------|---------------------------------------|
| nom | o | o | o |
| acc | o | o | o |
| dat | u | u | u |
| gen | a | a | a |
| inst | om | om | em |
| loc | e | e | e |

(ii) Phonological features on the stem do not suffice to predict inflection class (e.g., $N_{[fem]}$ ending in a soft ([-back]) consonant can be II or III); and there are no theme vowels, despite claims to the contrary (Wunderlich (1996), Wunderlich (2002)).

(iii) Semantic features on the stem do not suffice to predict inflection class (e.g., $N_{[anim]}$ can be IV).

Conclusion:

Class features are needed.

2.2.1.2 Analysis

Note:

Intra-paradigmatic syncretism can be accounted for by decomposing privative case features into more primitive, binary case features that are cross-classified (yielding natural classes of cases). These primitive features are semantics-based in Jakobson (1962a), Jakobson (1962b), Neidle (1988), Franks (1995)), and syntax-based in Bierwisch (1967), Wiese (1999), Müller (2002); we adopt the latter view.